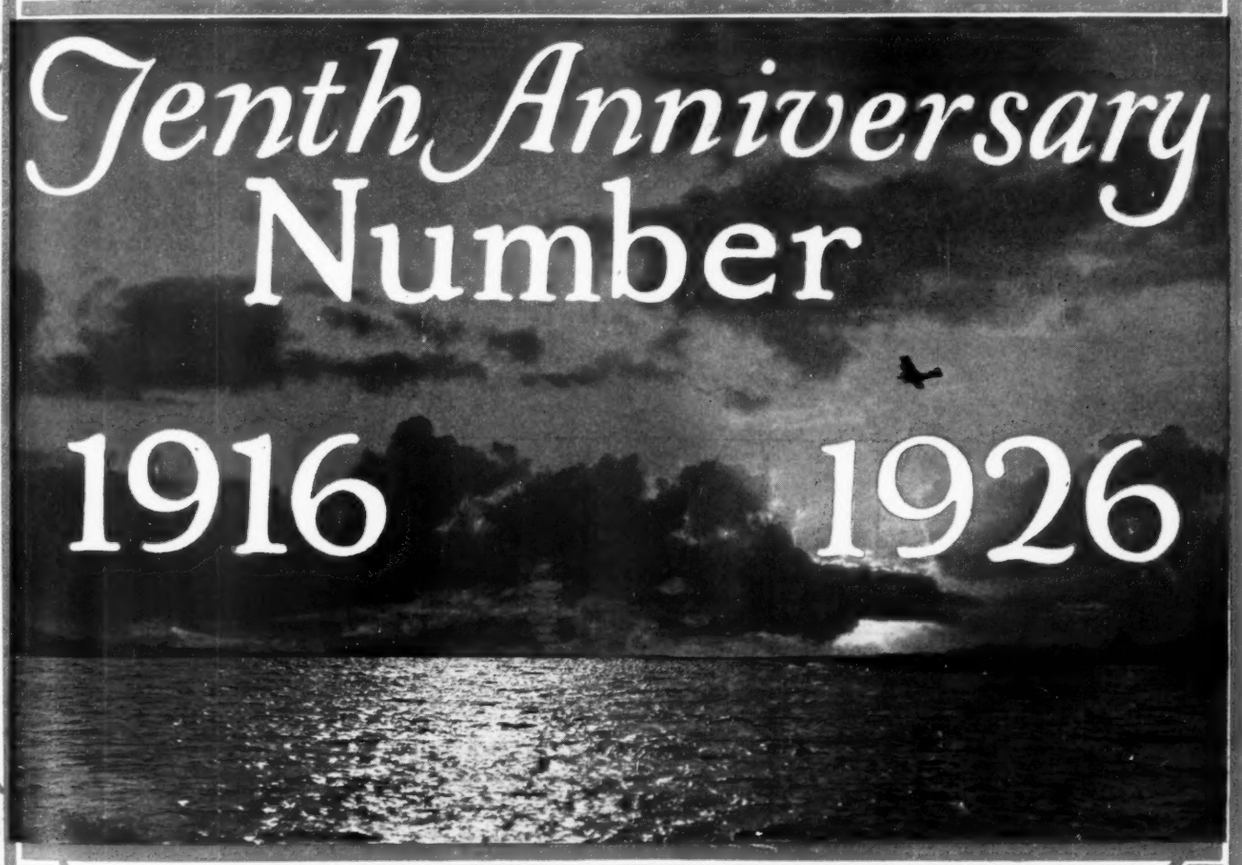
AVIATION

The Oldest American Aeronautical Magazine

AUGUST 2, 1926 Issued Weekly PRICE 15 CENTS



VOLUME XXI

NUMBER 5

SPECIAL FEATURES

THE AMERICAN AIRCRAFT INDUSTRY

A HISTORY OF THE U.S. ARMY AIR CORPS

A HISTORY OF U.S. NAVAL AVIATION

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK
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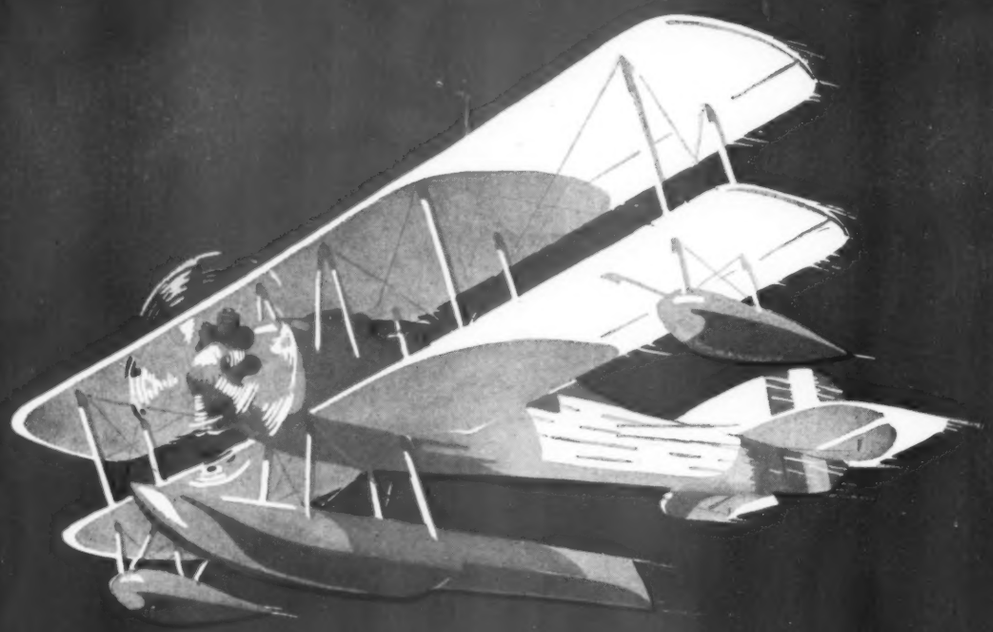

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RECENT developments in the aeronautical industry have only emphasized and reinforced the leadership of Vought. The superiorities in design, performance, durability and utility consistently exhibited in these proven aircraft have earned the universal preference of pilots and operating personnel, and have created a demand far beyond any heretofore registered in Vought history.

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to the High Performance of Many of the Most Modern Examples of Military and Commercial Planes. Logically, they have been selected for the Buhl-Verville "Airster" line of pleasure and commercial planes, which combines all the latest features designed to make the airplane a better and safer vehicle of rapid transportation.

The Buhl-Verville "Airster" with Wright Whirlwind Engine, constructed for one-man operation. The "Airster" is equipped with all the latest proven devices to insure safety, ease of operation and performance, such as folding wings, engine starter, side door cockpit, convertible baggage compartment, oleo shock absorbers, internal expansion brakes, and STANDARD STEEL ADJUSTABLE PITCH ALL METAL PROPELLER.

WE HAVE CONVINCING FACTS FOR DESIGNERS AND USERS OF AIRCRAFT

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PITTSBURGH, PENNA.

MARTIN U.S.A.

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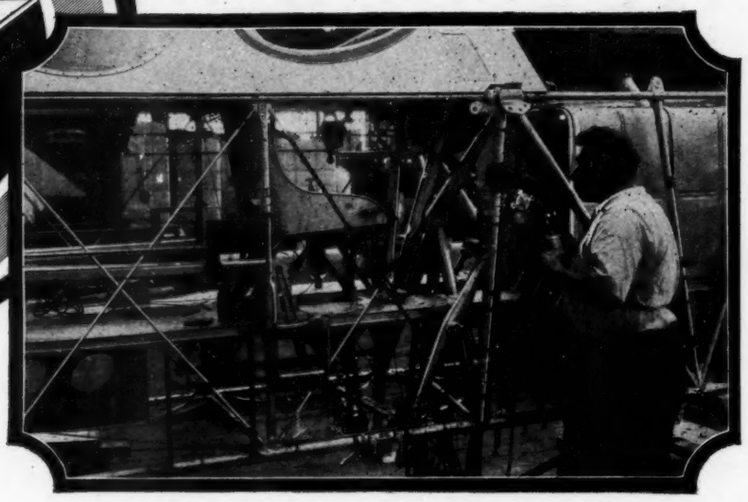
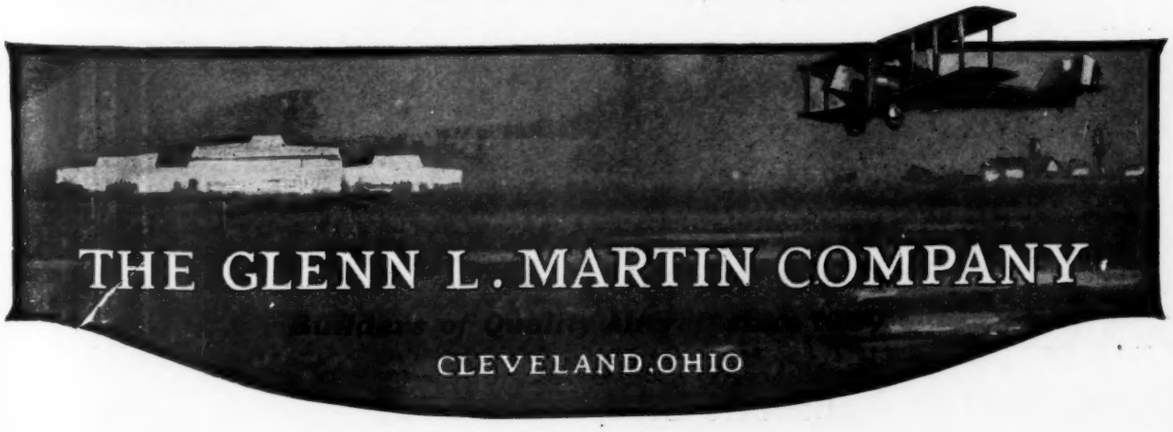


Peace Time Planes in Quantity Production

The Star in the Sky

Whether on the wing of a mail plane, a bomber, a naval reconnaissance plane or a commercial carrier, the tri-color star of The Glenn L. Martin Company holds the same significance to the experienced observer—*engineering supremacy—fine workmanship and unremitting care—experience dating back to the infancy of the art seventeen years ago*—DEPENDABILITY.

ALTHOUGH in many sections of this country a plane in flight in the sky or parked in a field is a sight sufficiently usual to occasion no comment, few people have any conception of the present size and solidarity of the industry. If you should ever wish to impress your non-flying friends with the growth of aviation, simply tell them that a single airplane factory (the Glenn L. Martin plant) has unfilled orders for planes on its books which total to three million dollars.



The BUHL-VERVILLE Whirlwind Airster

NOW BEING EQUIPPED WITH

SAUZEDDE Wheels AND Brakes

A PIONEER DEVELOPMENT

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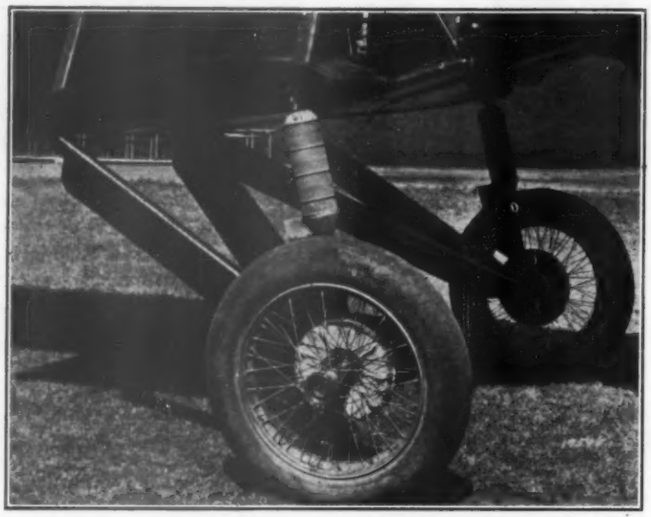

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1. Three rows of spokes to hub.
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4. Tandential spokes to sustain torque load.
5. Self contained unit.
6. Brake inside rim of wheel.
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15. Reduces ground roll sixty per cent after landing.
16. Increased safety.

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The AIRSTER is the plane for one-man operation—one man can start the engine—one man can fold the wings for towing or storage—one man can steer and maneuver the AIRSTER on field with brakes

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- Eclipse Inertia Starter
- Pioneer Vertical Instrument Board
- Sauzedde Wheels and Internal Expansion Brakes
- Convertible Passenger, Baggage or Mail Compartment
- Folding Wings
- Duotone Colors

PERFORMANCE WITH WRIGHT WHIRLWIND 200 H.P. ENGINE

High speed with 900 lbs. useful load,	125 m.p.h.
Climbs 10,000 ft. with 900 lbs. useful load,	in 13 min.
Ceiling	19,000 ft.
Landing speed	45 m.p.h.
Weight empty	1550 lbs.

Whirlwind AIRSTER without folding wings, brakes or dual control, $9,300 at Packard Field, Michigan
OX5 AIRSTER without folding wings, brakes or dual control, $3,750

Additional price for folding wings, $300; complete Sauzedde brake installation $500 extra; dual control $90 extra.

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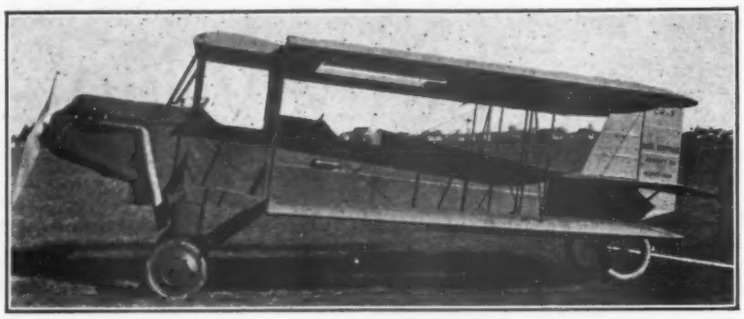
OUR FOLDER TELLS AN INTERESTING STORY—ASK FOR IT.

BUHL-VERVILLE AIRCRAFT CO. *uses* HASKELITE *exclusively*



THE BUHL-VERVILLE CW3 WITH WINGS FOLDED

The uniform quality of HASKELITE has won it a place as a standard on Buhl-Verville aircraft. Among the regular uses to which this builder is putting this waterproof plywood are: flooring, wing ribs, seats, and walkways, etc.

Nine months ago the company wrote: "We take great pleasure in informing you that we have found HASKELITE satisfactory and economical in every way. We sincerely trust that you will be able to maintain the high standard of quality and workmanship which we have found in your product."

The Buhl-Verville Company recently gave evidence of their continued satisfaction by contracting for a year's requirements of HASKELITE.

Write for full list of aircraft builders using HASKELITE and the many applications to which it is being put.

HASKELITE MANUFACTURING CORPORATION

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AVIATION STARTERS

Ten years' experience in development and production

Types and equipment to suit all requirements

A co-operative technical service at your command

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Elmira, New York — Walkerville, Ontario

AUGUST 2, 1926

AVIATION

VOL. XXI. NO. 5

Published every Monday

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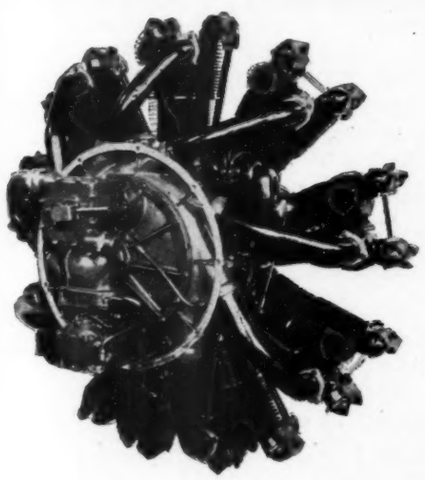
SCINTILLA



The Wright Cyclone 9 cyl., 425 hp. air cooled radial engine of 1657 cu. in., with a bore of 6 in. and stroke of 6 1-2 in., developed for the U. S. Navy. Ignition is supplied by two Type AG 9D SCINTILLA Aircraft Magnetos.

No. 10 in a series of modern American aircraft engines for which SCINTILLA Aircraft Magnetos have been selected as ignition equipment.

AIRCRAFT Engineers and Pilots insist upon ignition equipment of the utmost dependability.

BECAUSE SCINTILLA Aircraft Magnetos have notably met this requirement they have been adopted for most of the modern American military and commercial engines.

Contractors to the U. S. Army and Navy.

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The Curtiss "Hawk" Series

FOR PURSUIT TRAINING
WITH THE 180 H.P. WRIGHT MOTOR

FOR PURSUIT FIGHTING
WITH THE 440 H.P. CURTISS D-12 MOTOR

The Curtiss "Hawk" pursuit aeroplane is now available to the Army Air Service as an advanced training machine, with the 180 H.P. Wright E-2 motor substituted for the regular 440 H.P. Curtiss D-12 motor. Except for this power-plant change, the entire ship is identical with the regular P-1 "Hawk".

This new combination, which is known as the AT-4, has resulted in a machine that is peculiarly well-fitted for advanced training purposes.

ECONOMY: The installation of a 180 H.P. motor, quantities of which are in stock, make possible substantial reductions in initial and operating costs.

SERVICEABILITY: Several years of service development on the "Hawk" series by the Service Personnel and Curtiss Engineers have resulted in a machine that approaches perfection in its care and maintenance.

The AT-4 incorporates all of these improvements and is a type already familiar to the Service.

PERFORMANCE: The AT-4 has a high speed in excess of 130 m.p.h., a ceiling of over 15,000 feet with manoeuverability similar to the P-1, acknowledged the most manoeuverable ship in the world.

But the AT-4 is more than a training plane. The entire power-plant can be detached by the removal of four taper pins, and a regular D-12 power-plant substituted. Thus, in time of emergency, the AT-4 can be instantly converted into a standard P-1 "Hawk", ready to take its place in our first line of national defense.

The Navy advanced training problem can be similarly solved by the use of the 200 H.P. Wright J-5 motor in the Navy type of the "Hawk" seaplane.

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BUSINESS MANAGER

AVIATION

W. LAURENCE LEPAGE
EDITOR
VIRGINIUS E. CLARK
RALPH H. UPSON
CONTRIBUTORS

VOL. XXI AUGUST 2, 1926 No. 5

Ten Years

ANNIVERSARIES ARE more than an occasion for sentiment. They afford an opportunity to take stock of the work which has been done in the past and that which remains to be done in the future. To AVIATION its Tenth Anniversary also affords an opportunity to thank the many members of the Aircraft Industry who have supported it so loyally through good times and bad. The magazine has, by reason of this support, considered it a privilege to voice the best thought of those in the industry and to be its champion and spokesman in the many crises which have arisen.

It is difficult, in this brief space, to give an adequate account of our stewardship. In a field which is as new as aeronautics it is especially essential for the trade to have a medium for the gathering of reliable information and the spreading of the news of the continuous progress which is being made. The value of education does not stop with graduation from school and it has been the constant endeavor of this paper to publish articles and news items in sufficiently interesting form so that more and more people will read them and learn about matters aeronautical. Through descriptions of planes and the products of manufacturers, through technical articles on the theories which underlie flying, through the spreading of news of aeronautical doings both here and abroad, AVIATION has endeavored to weld the airminded into a closer sense of unity and to give them a stimulating view of the progress which was being made by others.

The aeronautical editor has a certain sense of perspective which is denied to those who are too closely tied up with the details of actually carrying on aeronautical business. He also has time and facilities for the gathering of information which should enable him to lead in the solutions of the problems which beset the industry and help fight its battles.

Shortly after the War, AVIATION made a thorough investigation of War cost which supplied the trade with valuable figures with which to counteract the accusations of large expenditures without results. Later, valuable figures were obtained on the Army and Navy appropriations which helped to clarify the situation even before Congress started its investigations. The problems which beset the manufacturers in regard to competitive bidding, manufacturing rights and government competition have been discussed at length. AVIATION opened itself as a forum for the discussion of air laws and endeavored to arouse an active and intelligent public opinion on the subject. Furthermore, AVIATION has endeavored to defend and supply information to the pilots and individual operators who have built up aerial service but who have not the sources of information available to the larger manufacturers.

No one realizes better than ourselves how often we have fallen short of what we have endeavored to do. Lack of funds has been a great handicap and, with the growing prosperity, we will be able to give our readers a better paper. AVIATION deems it an honor to be considered part of the Aircraft Industry and hopes to be able to continue to serve the growing field of aeronautics.

Foundations

AERONAUTICS HAS progressed with enormous rapidity during the last decade but, in many respects, the work done can be regarded merely as a matter of education and as a foundation for the work still to be done. Ten years ago, though much material was available, there were practically no trained aeronautical engineers in this country while now there are a large number of technically trained, experienced and competent designers who can produce satisfactory airplanes which will be the equal of any in the World. Factory organizations trained in the building of airplanes are equally essential and, though there was an enormous amount of aircraft building during the War, it is only within the past few years that a manufacturing industry has arisen which can in any way be called stable and established on firm foundations. In military matters the congressional laws of this year have laid out a fairly definite and stable program to be followed.

In commercial aeronautics the gypsy flier has become a fixed base operator and has created an aerial service business on foundations which seem permanent. Dusting, mapping and forest patrol have gone through the experimental stage. The air mail has done the pioneering work for aerial transportation and much has been learned from the operation of the European air lines.

There is, of course, no definite boundary line in such matters but in appraising the work of the last ten years it would seem as if much of the effort which had gone into aeronautics had been spent in gaining experience and that we now have the knowledge on which to build. Whether this building period will follow along the lines which we, by reason of our past experience, are bound to predict, cannot be prophesied. There are, in fact, some who feel that the form of the future plane will not resemble the airplane as we know it today. Whether or not this will be so is immaterial. The important fact is that now the aeronautical field is enjoying a close cooperation between engineering and manufacture and such a condition offers the best indications for the future. The progress of the next ten years may not be as spectacular as that stimulated by the War period but it would seem as if we had crossed the line and changed from an artificial industry based on a temporary condition and had become established on the firm foundations of an industry which fills a needed place in the economic life of a great nation.

AVIATION'S Decennial

Tenth Anniversary of AVIATION Celebrated With This Issue.

ON AUGUST 1, 1916, the first issue of AVIATION AND AERONAUTICAL ENGINEERING was published to meet a demand that was expressed by many of those who were at that time directing the trend of American aeronautics. They desired a publication that would give them the technical news that had not been available in published form up to that time. The paper met with immediate success from the readers' viewpoint and has continued, we must believe, from the growth of its circulation, to be relied upon, in the United States as well as in all parts of the world, as an accurate portrayal of the progress of aviation in America.

Lester D. Gardner

Disseminated Technical Information

During the first year, the course in Aeronautical Engineering was published in parts. It embodied many of the subjects taught in the aeronautical engineering course at the Massachusetts Institute of Technology and was issued with the permission of the faculty in charge. At that time, there was a scarcity of published scientific material on aeronautics and AVIATION AND AERONAUTICAL ENGINEERING immediately became one of the indispensable requirements to those who wished to keep informed as to the design, construction and operation of American aircraft.

Conditions regarding the amount of technical information available at that time were very different than since the War when there has been almost an indigestable supply of material made available. As this technical information became easier to obtain, the character of AVIATION AND AERONAUTICAL ENGINEERING changed to more of a trade paper, giving its readers more descriptions and news and less engineering. As conditions changed, the name of the paper became AVIATION, the "and Aeronautical Engineering" having been dropped.

Shortly before the United States entered the War and when such action appeared to be inevitable, another paper was started and called the AIRCRAFT JOURNAL. It aimed to give every week the news of the Services. It supplemented AVIATION and throughout the War it gave those in the Services all the news that it was permitted to print. In 1922, after the War had ended, it seemed to be advisable, owing to the great deflation in the aviation field to unite AVIATION and the AIRCRAFT JOURNAL, this union resulting in the present weekly,—AVIATION.

Inasmuch as a publication that stands still never serves its readers well, AVIATION has, since the War, attempted to render a service by discussing frankly and fearlessly some of the problems that the Government has had to solve. While it would be presumptious to take credit for even the smallest of the changes that have taken place, it is a fact, nevertheless, that most of the solutions reached have been modified somewhat by the influence of the readers of AVIATION.

During the last two years the growth of the number of readers has been most gratifying. The circulation of the paper has doubled and continues to grow, even with the increased price.

Indispensible Supporters

No review of the past ten years would be complete unless an appreciation were expressed to the manufacturers of aircraft and aircraft supplies who have used AVIATION to give their products publicity. The continuous use by the largest constructors, operators, and dealers indicates that our readers look to AVIATION not only for news but as a reliable guide for purchasing.

Fulsome self-praise on anniversaries is not becoming and, therefore, with these few words of explanation and an expression of appreciation to all our friends in the United States and abroad, AVIATION will continue to do its best every week to make its pages more interesting and helpful to its readers.

Lester D. Gardner Breaks Air Travel Records

Lester D. Gardner left these shores early in March with Mrs. Gardner for a 'grand tour' of Europe by air. He has called the trip a vacation, though most of us would call it hard work. His time has been so occupied that he has not written more than an itinerary of his journey but this itinerary is most interesting.

The figures of the trip are as follows:

Distance between places	14,385 miles
Distance flown (approx.)	15,500 miles
Time in air	170 hr. 53 min.
Train time for above	734 hr.
Visas 22	Fields 51
Cities 81	Countries 23
Pilots 50	10 different nationalities
18 types of planes	1 dirigible
11 types of engines	19 monies
16 languages	

Records—Berlin-Copenhagen-London-Berlin, 53 hr., —19 hr. flying.

Starting from London he has flown East as far as Bagdad on the Euphrates, North as far as Moscow and, when last heard from, he was heading South into Africa. Mrs. Gardner, with excellent sporting spirit, has accompanied him on many of the flights. Sporting spirit applies to the amount of energy which it requires to put in 170 hours flying in the short time that they have been abroad. Many of the flying fields are well out of town and many of the planes which have to make connections start as early as six o'clock in the morning. When Mr. Gardner returns, he will probably have flown further over the organized European air lines than any other American. His keen powers of observation and his knowledge of aeronautics should make his accounts of the trip most interesting. Mr. Gardner expects to return to this country about August 7.

REMEMBER — NATIONAL AIR RACES, SEPT. 4-11.

Expressions From Some of Our Friends

During the ten years which have elapsed since AVIATION AND AERONAUTICAL ENGINEERING *first appeared, there have been many periods of hard sledding. The prosperity or poverty of the magazine has varied with the condition of the industry and the industry has not always been prosperous. With the exception of the period when he was in the Air Service, Mr. Gardner has lived with the job of making the paper fill the needs of the trade. With indefatigable energy he has worked to keep the paper alive. It was not until this year that the paper was on a sound enough basis to warrant his taking a vacation. It is typical of him that he has spent the five months that he has been away not in a complete rest and holiday, but in most strenuously flying over the European air lines and studying the conditions under which the European industry is now working.*

That Mr. Gardner's efforts are appreciated is evident from the many congratulatory letters which he has received on the Tenth Anniversary of his paper. The present staff of AVIATION *feels it a privilege to print the letters given below, which do Mr. Gardner justice but which he would be too modest to print were he now in this country.*—EDITOR

S. S. Bradley,

General Manager, Aeronautical Chamber of Commerce of America, Inc.

That AVIATION is celebrating its Tenth Anniversary, on August 2, 1926, is a matter of more than passing interest to everyone interested in aeronautical development.

Please accept my hearty congratulations and best wishes for your future prosperity and increased usefulness.

Frank H. Russell,

Vice President, Curtiss Aeroplane & Motor Company, Inc.

It is a happy coincidence that permits the Curtiss organization to congratulate AVIATION upon its growth during the last decade at the time when we are all preparing to receive you back to this country after your very practical method of studying European aviation.

America's only aircraft weekly, now an authority on all aviation matters, should become a faithful guide for its further development.

We wish for you and your entire organization continued success and greater prosperity.

Charles L. Lawrance,

President, Wright Aeronautical Corporation

With the Tenth Anniversary of the initial issue of AVIATION, there comes an opportunity to see what has been achieved in aviation since August, 1916. We have in our files the specifications of a bombing plane prepared by Orville and Wilbur Wright, of the Wright Airplane Company, a little more than ten years ago. The plane was required to climb at a minimum rate of 200 ft. per minute while carrying a total weight of 450 lb., including fuel for four hours. The engine was to be subjected to an endurance test in the air of not less than two hours of continuous flight. The minimum speed was 45 m.p.h. These specifications were prepared only a little before the World War but no better comparison can readily be found of the advances that have been made in airplanes and airplane engines since that time.

In 1916 came the immediate necessity for quantity production of airplane engines and it was only natural that the engineers in charge of that production used the water-cooling principle to which they were accustomed from automobile practice. There was not time to stop and do the research and development work necessary to make air-cooled aviation engines. Consequently, the development of water-cooled aviation engines went forward with tremendous impetus and after the Armistice all countries participating in the World War were left with huge surplus stocks of water-cooled aviation engines. But the development of air-cooled engines for aviation was too sound a principle to be dropped and although plane engineers had become accustomed to overcoming the disadvantages of water cooling and although engine manufacturers were tooled up for making water-cooled engines, yet the developers of air-cooled engines could not be deterred and, in 1922, one of the most important of the National Air Races was won by an air-cooled engine. Since then, the popularity of air-cooled engines both in the United States and in Europe has increased tremendously until now the air-cooled engine is the standard pursuit engine of England. Hundreds of air-cooled engines are being built in France and the United States Navy has standardized on air-cooled engines up to 300 hp.

AVIATION, during its life, has seen this transition in principle from water-cooled power plants to air-cooled. AVIATION has seen the progress of the dependability of aviation engines from the 2-hour durability flight mentioned above to 50-hours of full throttle test running with air-cooled engines. It is possible that there will be no greater change in principle of aviation engines in the next decade than the change from water cooling to air cooling.

Grover Loening,

President, Loening Aeronautical Engineering Corp.

On the occasion of the Tenth Anniversary of your magazine, AVIATION, we wish to take this opportunity to express to you again our appreciation of your magazine, and our confidence and high regard in you.

Throughout what has been a trying period in the development of American aeronautics, the editorial pages of AVIATION have been singularly free from bias, and sound in judgment, and it is doubtful whether any other field of technical development in engineering or science has been represented in a world wide way by a more high class publication than yours has been for aviation.

Thomas H. Huff,

President, Huff Daland Airplanes, Inc.

I am very pleased to note that you are drawing close to the Tenth Anniversary of a remarkable record in an aircraft magazine.

This possibly may sound a little bold, but I sincerely wish to take this opportunity to congratulate you on the maintenance of an editorial policy which has been the source of a great deal of inspiration to me throughout my career in aeronautics.

The articles carried in your paper on technical aircraft engineering subjects make the issues of AVIATION worthy of being kept as a permanent record for file reference. The engineers in our organization continually refer to the very valuable technical data contained therein to assist them in the problems with which they are faced.

During the strenuous ups and downs that have become so much a part of aviation both during and following the war,

it has not been an easy lot to maintain a standard trade journal such as AVIATION.

When I congratulate you on "the oldest American aircraft magazine", it is with the thought to the trials and tribulations which have been yours during your ten years of experience. Your adherence to a strict standard of what the industry needed in an aircraft paper has placed you upon a pedestal in the eyes of everyone who has struggled to make aeronautics their ambition and livelihood.

Please accept the heartfelt thanks of Elliott Daland; C. T. Porter, chief engineer; Sidney Newborg; our treasurer; and myself—and accept our sincerest congratulations for this, your Tenth Anniversary issue.

Lieut. Col. B. D. Foulois,

Commanding Officer, Mitchel Field & 9th Observation Group

Please accept my heartiest congratulations on the 10th anniversary of AVIATION, the excellent magazine which has been published under your able direction for the past ten years.

Your policy, adopted ten years ago, to collect and desseminate aeronautical material, useful to the aeronautical engineer, the constructor, the aviator, and the sportsman, has produced excellent results. May the next ten years' progress in aeronautical development be as faithfully collected and disseminated.

Hon. Hiram Bingham,

United States Senator from Connecticut

I remember buying my first copy of AVIATION AND AERONAUTICAL ENGINEERING in Miami, Florida, some time during the month of March, 1917, when I was taking my first lessons in flying at the Curtiss School. I remember being impressed with its scholarly character and with the extent of my own ignorance. I did not realize that I was then reading one of your earliest numbers nor that I was to rely upon it during the next ten years for most of my information regarding the progress of flying.

What a decade it has been! It must be a great satisfaction to you to realize the important part which you have been enabled to play in the spreading of accurate aeronautical information.

It seems most appropriate that you should be celebrating the tenth anniversary of AVIATION just as our new national air program is getting under way. I hope that your next ten years will see as great an advance and be as successful as the past ten.

Cecil B. de Mille

Aviation has made tremendous strides during the past ten years. Perhaps the most significant feature is the successful development of night flying. Night flying denotes a very special confidence on the part of pilots toward their ships, and is sure to be the forerunner of very rapid refinement during the next three or four years.

Although I am not now actively involved in aviation, I retain a very deep interest in it and have very fond memories of the time when I was associated with one of the first commercial aviation companies to be established in this country. AVIATION has made splendid strides during the past ten years and during the next decade even greater progress will be made.

With very cordial best wishes for the continued success of your magazine.

Earle Ovington,

Congratulations on the Tenth Anniversary of AVIATION.

Is it ten years since I devoured your first issue? It hardly seems possible. How tempus does fugit!

From every indication, the Tenth Anniversary of AVIATION marks the beginning of aviation's "second wind". As an old cross-country racer, I know that one does not make real headway in a race until one gets his "second wind". And I think it will work out that way with commercial aviation. The "off, choke" period has passed! "Contact"—give her the gun!

F. B. Rentschler,

President, The Pratt & Whitney Aircraft Co.

Except for the pioneer accomplishment of Orville and Wilbur Wright, the past span of ten years contains almost the entire development of aviation in this country. After the birth of aviation, leadership in design and construction was taken up by others. When the necessities of war came upon us our only recourse to supply our needs was to copy the designs of European types of engines and planes. With no background of experience, there was nothing else for us to do, and this period obtained through most of our war activities. About the end of the war and from that point forward, we had learned enough to begin thinking for ourselves in new designs. Of course we had paid a premium price for our little knowledge.

Through the past seven or eight years a small but vigorous industry have fought their way back to the point where today our engineering and construction ability in aircraft is second to none. There has not been room in this industrial field for a great number or for large organizations. It has been a difficult field in which to carry on successful operations either from a financial or engineering point of view. Only the strongest have been able to survive. Even today it is a field wherein only a few with the best of experience and facilities can compete.

AVIATION has been one of us through this struggle. You have come through the same hard field that all have trod. You have lived up to your original policy of advocating vigorous and qualified industry, competent to take and hold its place in aviation development. With all of this in mind, it gives us particular pleasure to offer our sincere congratulations to you upon your Tenth Anniversary. Your success has been merited. We hope in the new field ahead, which seems to be expanding, that you will find a correspondingly greater success and prosperity.

Charles H. Colvin,

General Manager, Pioneer Instrument Company

We have been pleased to learn of the forthcoming anniversary of AVIATION.

While the Pioneer Company is not quite as old as your magazine, we have been represented by advertising space in every issue since our organization on March 1, 1919—which is tangible evidence of our regard for AVIATION.

We think of AVIATION more as an institution than as simply a trade paper, and next to the Aeronautical Chamber of Commerce, believe it to be the most helpful organization to which all of us in the industry may go for advice and assistance.

Ten years ago, when AVIATION was founded, we thought that commercial aviation was just ahead. The tremendous production of aircraft material during the War gave an impression of great progress, whereas little real advance was being made and that of only slight application to commercial aeronautics. It now appears that we have reached the end of the purely experimental period, and that "commercial" aviation will soon be more than a name. We may at least be sure that the realization of our hopes is ten years nearer than it was when we greeted the first issue of AVIATION on August 1, 1916.

Hon. Edward P. Warner,

Asst. Sec. of the Navy for Aviation

You will readily understand my special interest in the approaching Tenth Anniversary of AVIATION, in view of my long association with the paper, which extends indeed back to the preparation of copy for, and distribution of copies of, the very first issue. It is a pleasure to extend my personal congratulations to the magazine and its staff on its long and successful career.

REMEMBER — NATIONAL AIR RACES, SEPT. 4-11.

H. C. Richardson,

Commander (CC) U.S.N.

Remembering well your doubts as to public interest in aviation at the time you launched AVIATION and AERONAUTICAL ENGINEERING, it pleases me to note the success of your publication, particularly in its new form AVIATION with its weekly issue.

I congratulate you on the Tenth Anniversary but more particularly on the success you have attained in strengthening and broadening public interest in aviation which I look on as a national asset, from a transportation and military point of view. I believe the lean years are past. I await with keen interest the results of your extensive and intensive observations in Europe.

Casey Jones,

Vice-President, Curtiss Flying Service, Inc.

I note with a great deal of interest that AVIATION is celebrating its tenth birthday, and this coupled, with your return from a most interesting and instructive trip, should encourage you to even greater works than you have been able to accomplish in the past.

May I take this opportunity, in behalf of the Curtiss Flying Service, to express to you our appreciation of your continued cooperation in our activities during the last seven years, of your readiness to publish any interesting articles which we have been able to furnish, and also our hope and wish that our cordial relations may continue as successfully during the next decade.

William B. Stout,

Stout Metal Airplane Company

This aviation thing has been a disease and not an industry and all of us that have got bit by the bug in the early days have been unable to get rid of the air fever.

Anyone or any magazine that has been connected with the game for ten years must get great satisfaction from seeing it now developing from a game to an industry and from the medicine ball of politics to the stable business proposition that we have always hoped for it.

When the history of all this is written, the influence of yourself and AVIATION will be written large on the pages.

My sincerest congratulations on the Tenth Anniversary of your magazine and the great influence which it still wields.

E. N. Gott,

Vice President, Fokker Aircraft Corporation

It gives me great pleasure to be able to extend my congratulations to AVIATION on the occasion of its Tenth Anniversary.

Aviation has passed the three-ring stage. Its possibilities are being given serious consideration by conservative financial interests throughout the United States. The writer was particularly gratified to note the progress along this line in all of the large cities which he visited in the Middle West and on the Pacific Coast while on a six weeks' tour establishing dealers for Fokker airplanes in the various cities and territories. He was further gratified on this trip, to find that AVIATION appeared in practically every office which he visited.

I personally believe that AVIATION has done much to further the progress of aeronautics in this country. I sincerely hope that it will continue to prosper—not only for its own sake, but also for the sake of the entire aircraft industry.

Ralph Upson,

Chief Eng. Aircraft Development Corporation

Many congratulations on your Tenth Anniversary. The history of AVIATION for this ten year period has been so closely connected with aviation that we might almost look upon them as one. I only hope that the growing aircraft industry of the next 10 years will have the benefit of the courage, ability, and veracity, which have always so characterized your magazine in the past.

If I could sometimes wish that AVIATION would be a little more impartial in its views, it is perhaps forgetting that it is run by humans rather than by machines and, after all, the "human-ness" of aviation is the last thing that we could afford to lose.

W. Wallace Kellett,

Representative in America for Henri & Maurice Farman Aeroplanes

Please accept my most sincere congratulations on the Tenth Anniversary of AVIATION and my best wishes for many more years of continued success.

You and all the members of your staff who have so intelligently followed the progress of aviation during all these years and who have fought conquering so many difficulties in your chosen line of endeavors during these years have my fullest admiration.

Hon. W. Irving Glover,

Second Assistant Postmaster General

It is a long look ahead for a ten year period but it is just a short stretch of time to look back upon and so, when we look back to August 1, 1916, it did not seem to be such a great while when we read the outline you had of the future ot AVIATION on the front page of the first edition. The undertaking you started was a great task but those of us who knew you felt that you would accomplish your purpose and you have; your accomplishment has been complete.

You have proved the demand for the weekly edition of a magazine which would give to the aeronautical profession all the reliable information possible, a market place for the exchange of ideas, the results of experiments and researches, and space for the general discussion of the many controversial questions which of necessity would present themselves in the days of the forthcoming numbers of AVIATION.

If you had a dream, it has come true for AVIATION has established itself, and well, in the Aeronautical World, both military and commercial. Might I say that AVIATION has been a leader in the lighting of the way for aviation and its closely allied engineering industry. Its spreading columns of information, discussion and data are like the 24 in. beacons which light the way of the Transcontinental Air Mail route; they are as important to the route as AVIATION is to the Aeronautical World.

Sincerest congratulations to you on this tenth birthday of AVIATION and I wish for it a future success which is bounded only by the limits of the Aeronautical World.

Dr. F. W. Lewis,

Director of Aeronautical Research, National Advisory Committee for Aeronautics

It is a real pleasure to extend to you my congratulations on this, the tenth anniversary of AVIATION. In looking back over the past decade and the great advances that have been made in aeronautics, I especially appreciate the contribution that has been made by AVIATION in presenting accurate scientific data to the aeronautical profession. The weekly presentation, not only of technical data, but also of reliable and unbiased information as to developments in this country and in Europe, is of great value and a real stimulus in the retaining for the United States of leadership in this great art.

Walter H. Beech,

Vice-Pres. and Gen. Man., Travel Air Mfg. Co.

We wish to congratulate Lester D. Gardner upon his forethought and efforts in keeping aviation advancement before the public by this excellent magazine. We know that he, as well as everyone else connected with AVIATION, had a great many struggles, but, with the present interest in all aerial activities it is gratifying to know that everyone who has stuck with this work, has, in some manner, received the just reward he deserved.

We look with much interest each week for your magazine and we sincerely hope that you continue to grow as we know

you will, as fast as this modern art of transportation advances.

J. G. Vincent,

Vice-Pres. of Engineering Packard Motor Car Company

The celebration of the Tenth Anniversary of your splendid publication, AVIATION, is a fitting time to pause and devote a little thought to the past and future of this new industry.

In its broadest aspect air transportation to my mind has the brightest future of all methods of transportation and represents the concluding phase in the efforts to develop means of transportation as far back as the history of mankind goes.

Of course, aviation will not eliminate the other means of transportation or seriously affect their use except for such purposes as long distance passenger carrying and transportation of valuable or perishable items of commerce.

It does not appear at the present that there are any engineering reasons why the destiny of aviation will not pursue its logical course. As an economical and efficient means of transportation we have already abundant proof, translatable in terms of ton-miles per gallon of fuel.

It pleases me to think of this wonderful new industry as of a monumental structure which we are starting to build. So far, we have only been working at the foundations and on certain parts of the foundation the surface has barely been scratched.

Some twenty-two years ago, the Wright Brothers turned over the first spadeful of earth, as it were, in building the foundation for this monumental edifice. Since then, a huge amount of research work has been undertaken and in some respects our foundations are carried down to bed rock. In other branches we have not traveled so far and much remains to be accomplished.

Indeed, recent astounding developments abroad may result in an airplane which differs in a startling degree from what we are now pleased to term conventional designs.

Finally, this foundation building is not only very discouraging at times but is also quite dangerous, and we should pause at this time in reverence to those heroes who have given up their lives in the pioneering efforts of building up this tremendous new industry.

On the ultimate benefits destined to be enjoyed by mankind arising from air transportation space forbids me to discuss in detail, but I can picture these benefits totaling up more than what would represent the aggregate value of all of the present means of transportation put together.

Alexander Klemin,

Prof. of Aero. Eng., Daniel Guggenheim School of Aeronautics, N.Y.U.

The Tenth Anniversary of AVIATION has a peculiar and touching interest for me, because I had the pleasure and privilege of being associated with you at its first issue of August 1, 1916, as Technical Editor.

This work was to me of tremendous responsibility and of real difficulty. I found in you a chief of great energy and leadership and you steered me through many pitfalls.

I remember faithfully your instructions to me. The paper was to be correct technically above all things. It was to write the truth always. It was to be unbiassed by any considerations of friendship or business policy.

No matter how hard it was at the moment, you always insisted that this policy be followed.

And it has been followed ever since that fateful date of August 1, 1916.

I think that your energy and uprightness in the conduct of AVIATION have been rewarded by a preeminence in the field of American aeronautical publications that will never be challenged. I believe that AVIATION now as ever is one of the most powerful and useful influences in American aeronautics.

It is rather remarkable to think that your return from Europe after a flying trip which is unique in our annals should coincide with a period when commercial aviation in the United States is taking such a rapid and welcome extension. I am confident that the experience and information you have gained on this trip will enable you to render even greater service in the promotion of American aeronautics, a cause which is so dear to all of us.

Godfrey L. Cabot,

President, National Aeronautic Association of U.S.A.

It gives me much pleasure to write you on the celebration of the tenth anniversary of AVIATION, for the reason that I think your publication has, on the whole, during the ten years, contributed more to the information of the public on matters aeronautical, than any other one publication.

It seems to me that the great future of air transportation is passenger transportation, both national and international and that persons now living will live to see a time when air transportation is the most important method of passenger transportation, for distances from 100 miles upward. I do not think that it will ever replace the automobile as a private amusement or seriously compete with railroads and steamers for heavy and cheap freight, but I do think that there will be a large and growing express business done through the air.

Vincent Burnelli,

Vice-President, Chief Eng. Remington Burnelli Aircraft Corp.

On the occasion of the tenth anniversary of the establishment of AVIATION, I am pleased to extend congratulations and express confidence of its future success.

Having been a reader of AVIATION since its first issue of August 1, 1916, I certainly recognize the value that has been rendered to the aircraft industry through its consistent effort and policy to disseminate technical information and news that is worthwhile and accurate.

AVIATION's service of aeronautical information and its missionary work forms a splendid background for your late achievement of flying over 15,000 miles, which correctly rates you as being the world's most experienced air traveler.

W. A. Yackey, Jr.,

Manager and Chief Pilot, Yackey Aircraft Company

I regret that I cannot meet you in person at the docks and greet you upon your return from Europe. I want to congratulate you for your enviable record as the most traveled air passenger. But most of all, I want to praise you for the manner in which you traveled to the hearts of the people in aviation in Europe. You have carried our banner in many conflicts with honor and distinction for yourself and aviation in the United States.

You should be justly proud at this particular time when you realize that you have overcome against tremendous odds the most insurmountable obstacles in the last ten years in your most wonderful magazine AVIATION, the clearing house and disseminator of technical, commercial and friendly news for those who have had to overcome the obstacles of pioneering in aviation. Looking back it reminds one of the great war—it is an experience that is worth a million but you would not repeat it for a million.

Your magazine has proved it is built on a strong foundation directed by men of character and ability. It is a healthy magazine that fears none and loves them all. Very seldom aviators can be brought to agree on one subject. There are always many and various different ideas but the fact that AVIATION has survived the last decade is proof that you have pleased us all. You have done this age and aviation a great deal of service second to none. I feel like the great author who wrote, "When leaving this world behind, we should leave foot prints on the sands of time that will live after us". Your footsteps will always be in the sands of aviation.

You will undoubtedly continue to render us a service, but I must congratulate you and your magazine on its wonderful strides accomplished in the last ten years. Without the magazine and you, I know that commercial aviation would not

have accomplished what we have and would be many years behind our present status.

I want to extend you our happiest congratulations and our kindest personal regards.

Howard E. Coffin,

President, National Air Transport, Inc.

Whatever may be the objections which may be urged against recent legislation enacted by Congress, it is, I am sure, recognized by all that a great stride forward has been taken, and that a sound foundation for the future development of our American air power has been begun.

It seems to me that we have now definitely arrived at a stage where we may well cease importuning the Congress and the Governmental Departments for legislative enactments and assistance, and must now devote all of our energies to the education of the public in the patronage of the various forms of air navigation facilities. It also seems to me that our national effort must now be concentrated upon the development of dependable air transport facilities and the building up of the public good will in the practical terms of public service. Your magazine, AVIATION, has done lots of missionary work in this line. It must do a lot more, because this question of air tonnage and patronage seems now likely to become the determining factor in the success or failure of a non-subsidized American commercial air business. Good luck to you.

Harris M. Hanshue,

President, Western Air Express, Inc.

To have been so long and so actively identified with aeronautical development must be extremely gratifying to you and to your publication, especially as you have managed—both personally and in print—to keep pace with this industry to which your efforts imparted so much of the initial impulse.

My own connection with aeronautics is only one year old, although previously to that I had followed the progress in this field through the medium of the press and periodicals such as AVIATION.

May we hope that you and AVIATION come in for your share of the reward.

Rear Admiral W. A. Moffett,

Chief, Bureau of Aeronautics, U.S.N.

I desire to congratulate your magazine, AVIATION, on the completion of ten successful years of endeavor which have been of great value to the progress of aviation.

The advances made in regard to added power, greater speed, larger loads carried, greater cruising radius, and safety of operation are truly remarkable. These results, however, should be exceeded during the next decade, as the needs of aviation are continually growing and the ranks of those competent to produce such results are being constantly augmented.

Raymond Ware,

Secretary, Thomas-Morse Aircraft Corporation

Your return from a memorable tour in the interests of aviation coincident with the Tenth Anniversary of AVIATION is reason enough to extend to you hearty congratulations and best wishes. To those of us who elected to continue in the field of aeronautics after the war, little did we think that the road to recognition of the potential value of aircraft as an arm of national defense or for commercial purposes, would be such a weary one.

The year 1926, however, gives promise, thanks to the recent legislation passed by Congress, of placing aviation in its true light, and, incidentally, rewarding us for our patience and perseverance. Much credit is due to President Coolidge's administration, for the business-like way in which a most difficult situation has been handled. And it is fortunate for the advancement of aeronautics that men nationally known for their ability and interest in aviation have been selected as assistant secretaries in the War and Navy Departments to direct the progress of development and expansion.

With such a promising outlook it is to be hoped that more encouragement will be given metal construction of aircraft, a necessity which needs no comment.

Igor I. Sikorsky,

President, Sikorsky Manufacturing Corporation

It affords me great pleasure to congratulate you and your associates of AVIATION on the occasion of the Tenth Anniversary of the publication of your esteemed magazine.

When you started your work in connection with the publication of this magazine you undoubtedly had much against you. Aviation was then only in its infancy and very few could see its future development and use. Immediately after the War, there was again a very dull period during which time aviation was almost forgotten and the cause certainly then needed men of your type who would keep the interest alive and patiently wait for the date when their work would be recognized and rewarded. During all these years, you have been fighting valiantly for the cause of aviation and it seems to me that you might derive great satisfaction from the fact that the recently adopted Air Commerce Act of 1926 reflects, in the main part, the principles on which you have so firmly been standing.

Permit me to wish you and your associates continued success.

Howard F. Wehrle,

Managing Director, National Air Races, 1926

Permit me to extend my sincere felicitations to AVIATION upon the Tenth Anniversary of its initial appearance in the field of flying, in which it has proved itself a pioneer and guide to the aviator and a dauntless champion of his calling.

AVIATION has always stood for the right, for the highest standards of sportsmanship and for America's supremacy in the air and in aviation invention and progress. It has, in fact, pointed the way to new goals for aeronautics and has inspired the airmen to fresh achievements. While I have not always agreed with AVIATION and its views and editorial policies, I have always had the greatest admiration for the courage it displayed in expressing its opinions and championing them, but, withal, showing fairness and an open mind that admits a frank change of opinion when convincing facts are shown.

I wish AVIATION many happy returns of its anniversary, a long life and a prosperous one and the continuance of the respect and confidence of the flying profession.

R. H. Fleet,

President, Consolidated Aircraft Corp.

We have just been reminded that Aug. 2 is to be the Tenth Birthday of AVIATION. We extend our every sincere wishes for many happy returns of the day.

It strikes us, however, that, on this occasion we must not only congratulate AVIATION but extend our compliments. Its parents and "in-laws" have, through many lean years, contended with the very difficult task of trying to be patriotic and reasonably progressive, as well as properly dignified and truthful, and, at the same time, trying to make a living. It appears to us that you have accomplished this task in excellent fashion. AVIATION has been consistently interesting, instructive and inspiring.

Wesley L. Smith,

Pilot, U.S. Air Mail Service

This conveys my hearty congratulations to you on the occasion of the Tenth Anniversary of AVIATION. I have been a constant reader of aeronautical periodicals since there have been any. These periodicals have, for the most part been short lived. AVIATION has now outlived any of these other American publications and I believe that the fact that an aeronautical publication has survived for ten years indicates the progress of this means of transportation from infancy to childhood.

I congratulate you on the Tenth Anniversary of AVIATION. May you mark its Twentieth Anniversary by flying around the Earth, even as you have just commemorated its Tenth Anniversary by flying all over Europe.

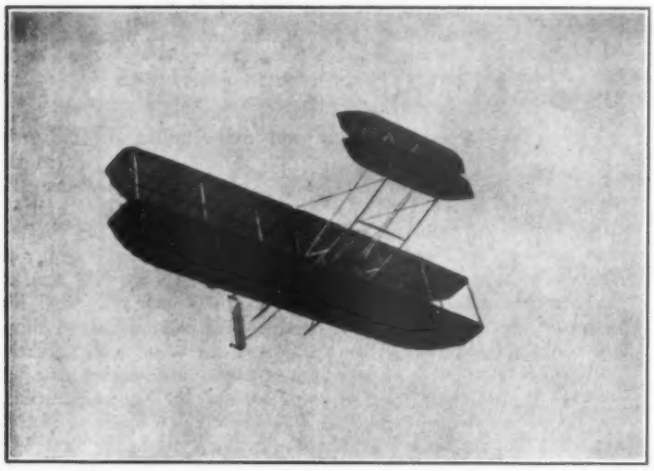
REMEMBER — NATIONAL AIR RACES, SEPT. 4-11.

A History of the U.S. Army Air Corps

Retracing the Story of Military Aviation From its Inception.

THE EARLIEST date to which the inception of the United States Army Air Service might be referred is that of the Civil War, when observations from balloons were made for the Army of the Potomac by civilian aeronauts. The possibilities of aeronautics in warfare had, probably, been recognized by exponents of military strategy for centuries, certainly long before the dream of soaring above the earth had actually been realized, but the very first record of the actual utilization of these possibilities dates back to the year 1794. In June of this year, the French employed a captive balloon for observation against the Austrians in the Battle of Fleurus.

In 1890, Congress extended the scope of the Signal Corps of the U. S. Army to include aerial operations and about



Orville Wright flying at Ft. Myer, Va., on Sept. 9, 1908. The flight lasted 1 hr. 2½ min.

this time a spherical balloon was purchased from France and used at Fort Riley and Fort Logan. At the latter place a hydrogen plant and a shed were installed and operations became comparatively extensive. Captive military balloons were again used by the Army at Santiago during the Spanish War. In 1906 several Signal Corps officers began free ballooning and by 1907 these activities became quite extensive, student officers of the Army Signal School at Fort Leavenworth being instructed in ballooning at Fort Omaha. However, the establishment, on July 1, 1907, of an Aeronautical Division in the office of the Chief Signal Officer, Gen. James Allen, would seem to mark the true beginning of the present Army Air Service.

The First Airplane Bids

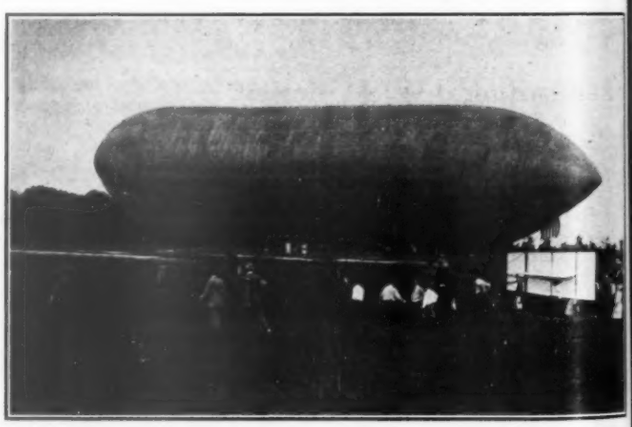
During this period, the Wright Brothers had been experimenting continuously but had gained little sympathy from official circles, until, finally, in December, 1907, the Signal Corps issued specifications and called for bids for a heavier-than-air machine which would carry two passengers, fly for one hour and make a speed of 40 m.p.h. Incidentally, at the same time bids were called for on an airship. It is particularly interesting to note that the first country to contract for an airplane was the United States.

On Sept. 3, 1908, Orville Wright began tuning his machine up at Fort Myer to fulfill the terms of the contract. His first flight on this occasion was a series of ups and downs and, after circling the drill ground once, he brought the plane to the ground to avoid flying into the hangar, the only damage being a broken skid. In a few days he became master of the plane and began to complete the contract requirements by carrying a passenger. Lieut. T. E. Selfridge, one of the real pioneers of military aviation in this country was the passenger, but a broken propeller resulted in a fall in which Orville Wright was severely injured and Lieutenant Selfridge was killed,—the first military flier to make the supreme sacrifice in an airplane.

Flying was postponed until a new machine could be built and on July 30, 1909 Orville Wright and 1st Lieut. Benjamin D. Foulois (now Lieutenant Colonel, U. S. Army Air Service, and Commanding Officer, 9th Observation Group, U. S. Army Air Service, Mitchel Field, L. I., N. Y.) completed at Fort Myer the final official flight. This consisted in part of a flight of 1 hr. 12 min. duration with a passenger, which was a World record at that time. The speed of the plane exceeded the required 40 m.p.h. by 2 m.p.h., for which fact the Wright's received a bonus of $5,000 on their purchase price of $25,000. It should be mentioned here, that a number of bids were received by the Government at this time and three were accepted but the Wright's were the only ones to deliver a machine.

The Army's First Airship

As has already been mentioned, bids were called for at the same time for a small non-rigid airship. Capt. Thomas S. Baldwin was the only successful bidder and in 1908 the "Signal Corps, No. 1" was accepted. With the maker of the engine, Glenn H. Curtiss, at the throttle and the maker of the airship, Captain Baldwin, at the helm and after a couple of forced landings in a corn field due to engine trouble, the airship fulfilled the requirements, which consisted of flying back and forth over a two mile course continuously for two hours. After careful calculation it was decided that the speed of the airship was a little more than 20 m.p.h. and the ship was accepted subject to the requirement that two Army officers were instructed in its operation. The "S.C. No. 1"

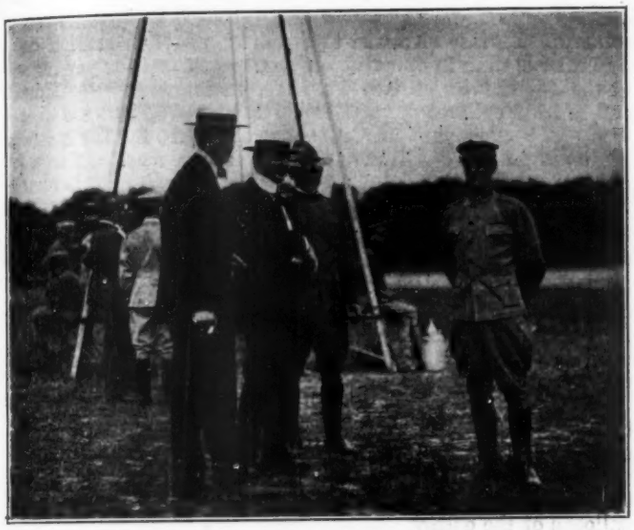


The "Signal Corps No. 1", the Army's first airship

was not used after 1909 and the Army had no more airships until a non-rigid Goodyear was acquired in 1919 and two Blimps were purchased from the British Navy in early 1920. The Summer of 1920 saw the Army Air Service with seven non-rigid airships—three British, two French, and two American, together with the Italian semi-rigid, Roma.

To return to early history, in 1910 the Army had but one officer and nine enlisted men on aeronautical duty; one airplane, one airship and three balloons. The 1910 Field Service Regulations provided for an aviation company but the Signal Corps had not the personnel in sufficient numbers to permit this, in spite of unsuccessful official arguments for aeronautical appropriations. However, on March 3, 1911, Congress voted the first money specially for aviation, namely, $125,000 with $25,000 immediately available. This money permitted the purchase of a little aeronautical equipment for training and maneuvers at San Antonio, Tex. An aviation

school was started at College Park, Md., and experiments with airplane radio and photography were carried out. A Lewis machine gun was fired from an airplane at College Park in 1911, this being the first time such a thing had been carried out. Other experiments were carried out, notably with the Riley Scott bombing device, the invention of a former Army officer. In 1912, this instrument was taken to Europe where it won first prize in an international competition. By the Summer of 1911, six officers held airplane pilot certificates and the equipment included five airplanes and three small balloons. Incidentally, during this year, Lieutenant Foulois made a notable cross-country flight in Texas, dropping



Members of the Military Aeronautic Board which passed upon the Wright Brothers flight for the Military contract, July 30, 1909. The Board included, Squier, Saltzman, Wallace, Lahm, Foulois, and Selfridge.

messages. It appears that about this time the real handicap in military aviation was a lack of trained personnel rather than a lack of equipment.

Returning to appropriations, this problem brightened up somewhat, according to ideas at that time, in 1912 and, during the period 1912-1916, $1,275,000 were appropriated and in August, 1916, after much official and public agitation, $13,281,666 were appropriated, the first large sum the Army had had at one time for aeronautical purposes.

This somewhat brighter financial position during the years 1912-1916, resulted in a widening of activities and in November, 1912, the available equipment had reached eight hangars at College Park, and twelve airplanes and the personnel consisted of a detachment of 12 officers on aeronautical duty and 39 enlisted men. In 1913, the College Park school was transferred to Texas City in order to carry on aviation in the presence of the troops concentrated there. Quite a lot of flying was being done at this time and during the year a second school was opened at Fort McKinley in the Philippines which was later moved to Pasay, and a third school was started in Hawaii. This latter was transferred later to San Diego.

On Sept. 30, 1913, there were 23 officers and 91 enlisted men on air duty with 17 airplanes, while in October of the same year these figures had increased to 24 officers, 115 enlisted men and 7 civilian employees. From June, 1913, to February, 1914, a very great deal of flying was carried out, the actual figures being, 3340 flights, with a total of 849 hours, and 796 passengers carried. In the Philippines, 774 flights were carried out, totaling nearly 117 hours. By this time the air division of the Signal Corps was giving a considerable amount of attention to technical development. Photography and aerial mapping were being investigated, considerable time was devoted to tests on lubricating oils. The cooperative possibilities of airplanes were being tried out and signalling methods were devised by means of the use of Very pistols and smoke bombs.

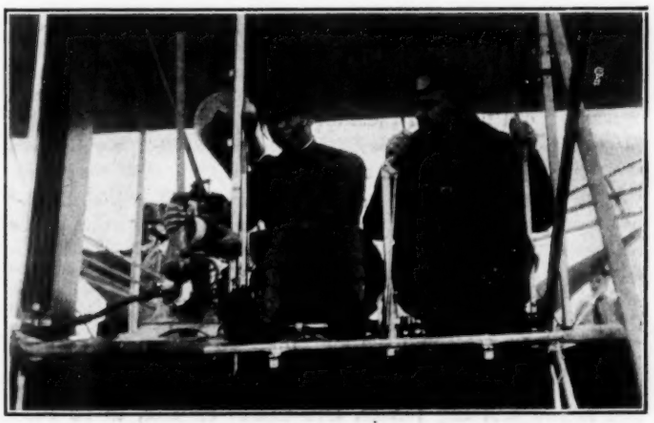
A significant landmark is to be recalled in August, 1913, when a bill was presented to Congress providing for an aviation branch to be part of the Army. The bill was opposed by the Signal Corps and in its place an act was passed, July 18, 1914, to create an "Aviation Section" in the Signal Corps. It authorized a force of 60 officers, 260 enlisted men, with an increase in pay for flying. This gave the service a definite status, attracted the very best personnel and gave much needed encouragement to manufacturers. The impetus was immediately felt and in September, 1914, the first Aero Squadron, actually the first United States tactical aviation unit, was organized at San Diego. It consisted of 16 officers, 77 enlisted men and 8 airplanes.

The Chief Signal Officer continued to recommend an increase in the allowable personnel of the Aviation Section and in July, 1916, the National Defense Act came into effect and provided, among other things, for an increase of personnel to 148 officers and 4000 enlisted men, and certain restrictions as to age, etc., were removed.

The N.A.C.A. Created

There is one feature which has not so far been mentioned and it is of very vital importance considering the appreciable amount of technical development work which was carried on by the Aviation Division from its earliest days. On March 3, 1915, the National Advisory Committee for Aeronautics was authorized to Congress to supervise and direct scientific study of the problem of flying and to discuss the solution and application of aeronautical problems to practical matters. The Committee included, and has continued to include, representatives of the War and Navy Departments and the Departments of the Treasury, Agriculture, and Commerce, and the Smithsonian Institute.

The first real experience in service flying was obtained in 1916. On March 15 of this year, the 1st Aero Squadron, under the command of Capt. B. D. Foulois, began operations at Columbia, N. M. The events leading up to this are interesting. The 1st Aero Squadron, which was organized at San Diego on July 1, 1915, has been stationed at Fort Sam Houston, Tex. On March 13, 1916, orders were received to report the squadron to General Pershing for immediate service. Accordingly, two days later the squadron had arrived, by air, at Columbus and made a reconnaissance into Mexico that same day. It accompanied the Expedition in its advance



Phillip O. Parmalu and Lieut. M. S. Crissy in a Wright plane with the first explosive to be dropped from an airplane, San Francisco, May, 1910

and performed most valuable service in reconnaissance, courier and communication work. Some of the difficulties under which the squadron labored were tremendous. For instance, it was found that the Curtiss J.N.3 planes with which the squadron was equipped were underpowered for service conditions and could not cross the Sierra Madre Mountains (9000 ft.), nor could they fight the extremely high winds of northern Mexico. Engine failures resulted more than once in forced landings far over enemy territory, the pilot and observer having to make their way back on foot with little or no provisions. It was not long before all the eight planes with which the squadron was equipped were crashed and a limited number of higher powered Curtiss machines were received to take their places. The squadron, however, under Captain Foulois, did remarkably valuable work. At this time, the headquarters of

the Aviation Section, Signal Corps, was in Washington, consisting of five officers under Lieut. Col. George O. Squier, who assumed command on May 20.

A small number of firms were then making airplanes and engines in small quantities for the United States and foreign governments. It was at this time that Congress made its first large appropriation for aviation as already recorded, and thereby, unknowingly paved the way for the colossal development which was soon to be called for with the entrance of the United States into the War. At the declaration of war on April 6, 1917, the Aviation Section consisted of 65 officers of whom 35 were fliers, and 1087 enlisted men, divided mainly into seven squadrons, three of which were not completely organized. The First was at San Antonio, the Second was divided between Rockwell Field, San Diego and the Philippines. The three partially formed units were at

The first tractor biplane purchased by the Government. A Curtiss machine at Hammondsport, N.Y.

Rockwell, Hawaii, and Canal Zone. Hazelhurst Field, Mineola, N. Y. and Rockwell Field were in operation as primary flying schools for the Regular Army, while Chandler Field, Essington, Pa., was opened on April 1 for National Guard instruction. The airplane strength was 55. These planes were of the training type, without equipment and not very suitable for war service, especially in view of the three years of experience which had been gained in Europe by the Allies and the enemy. On the whole, therefore, the conditions prevailing did not lend themselves very well to the rapid expansion which was necessary.

War Program

With the assistance of the Allies, however, things immediately began to move. European service men and engineers came to this country, men trained in the school of the War, and American service men and engineers went to Europe, and an extensive training program was immediately laid down. The program reached a head with the Allied request that the United States reinforce the air power on the Western front in 1918 by 50,000 airplane pilots, 50,000 mechanics and 4,500 airplanes. This was estimated to mean 13,125 service planes and 10,200 training planes, and 41,810 engines, to be constructed within a year. Gigantic though this was, it was reported as possible and was approved and, on July 25, 1917, Congress appropriated the estimate of $640,667,889 for the program. It is important here to note that while additional appropriations were made later, the actual expenditures did not in fact reach this amount since large sums were, later, returned to the Treasury.

The general policy was immediately to build up training schools and to fill up all vacancies in allied schools until these home schools could be built. Pending the time that the American industry could get into full production, planes for the needs of the American fliers overseas were purchased from the Allies, notably the French, raw materials and even mechanics to help make these planes being, in some cases, furnished by the United States. Believing that the greatest good could be obtained by standardizing on as few types of engines and airplanes as possible, the DH-4 was adopted as the only American built service plane for observation and bombardment for 1918. The French were to supply the pursuit planes necessary. The production finally centered upon the DH-4 with Liberty 12 engine for service, and the Curtiss JN4-D, JN4-H, JN6-H and Thomas-Morse planes, with Curtiss, LeRhone, Hall-Scott and Hispano Suiza engines for training in the United States. Other types were, of course, built for experimental purposes.

It will not be necessary here to go into the analysis of the products of the industry under this program. In all, 5034 service airplanes were built, and 22,741 service engines; 8860 training planes and 19,212 training engines. Very naturally, there was a colossal amount of inertia to be avercome in launching a program which could bear such a result. The remarkable part played by the aircraft and automobile industries in bringing about this result is told elsewhere in these columns. So intensive was the training program carried out that schools were in operation day and night and the personnel of the Air Service on Nov 11, 1918, numbered 20,568 officers and 174,456 enlisted men. Of this number, 78,726 were overseas. The equipment at this time consisted of 3538 service airplanes with the A.E.F. and 4865 service machines in the United States.

Lighter-Than-Air Activity

During this period considerable expansion of the lighter-than-air section was made as far as free and captive balloons are concerned. The total number of balloon officers in France at the time of the Armistice was 446, with 6365 enlisted men. Forty-six free balloons and 944 captive observation balloons were constructed in the United States and 265 of these were with the A.E.F. at the time of the Armistice.

American fliers flew for 35,747 hr. over the enemy, covering a distance of 3,574,700 miles. Of the flights, 12,830 were for pursuit, 6672 for observation, and 1174 for bombing, in which 275,000 lb. of explosives were dropped. The Air Service in France shot down altogether 776 airplanes and 72 balloons of the enemy.

To return to the actual constitution of the Air Service, it will be recalled that from July 1, 1907 there was an Aviation Division in the Signal Corps. On Oct. 1, 1917, this became the Air Division, and, until May 20, 1918, aviation was adminstered by Brig. Gen. George O. Squier, then Chief Signal Corps Officer. On April 24, 1918, the War Department appointed John D. Ryan Director of the Bureau of Aircraft Production and Maj. Gen. William L. Kenly head of the Division of Military Aeronautics. This was confirmed by the President on May 20, 1918, and the aeronautical activities of the Signal Corps were automatically dropped. For better efficiency, these branches were combined on Aug. 27, 1918, with Mr. Ryan as Second Assistant Secretary of War. On March 8, 1918, Maj. Gen. Charles T. Menoher assumed the post of Director of Air Service, changed on July 20, 1920, to Chief of Air Service. Thus began the life of the U. S. Army Air Corps as we know it today.

With the air operations of the Army carried on up to and during the War as an activity of the Signal Corps, it has been since the War that the constitution of the Air Corps of the present, has been in the process of formation. It was very natural that, at the close of the War, operations should be cut down enormously. The size of the Service was very greatly reduced until, in Nov., 1920, the personnel of the Air Service consisted of 1090 officers including those Army officers detailed to the Air Service and those temporarily allotted to other organizations, while the enlisted men numbered 8,343. The constitution of the service was that of a separate and co-ordinate branch of the Army. As a combat arm it consisted of three distinct branches,—Pursuit, Bombardment and Attack, while it was further divided into heavier- and lighter-than-air branches, the latter being subdivided into balloon and airship divisions.

During the past six years the Air Service has been extremely active, with Major General Mason M. Patrick succeeding Major General Menoher as Chief, in 1921, and maintaining the position to date. In spite of the fact that the possible scope of the Service has, very naturally been considerably curtailed by the greatly reduced appropriations it has been found possible to carry on a program of development which may be summed up under, perhaps, three headings, namely, service training, technical development, and the aiding of

commercial development. In the latter sphere, the activities have been most impressive. The Air Service has, in many cases, shown the way for civilian commercial fliers to follow on. It has been considered by those directing the activities of the Service that training could just as well be provided for personnel in some of the requirements of military aeronautics if activities which were of value to commercial development were adopted.

With this object in view, undoubtedly among the most important activities of the Air Service have been those of the Airways Section. This was established in 1921 under Capt. B. S. Wright, assisted by Capt. St. Clair Streett, who resumed charge when Captain Wright was detailed to troops in 1924. In the first place, it was realized that a most important section of the training of Air Service pilots was that of cross country flying and that practice in this class of flying could be carried on in such a manner as to emphasize throughout the entire country the possibilities of air transportation. Accordingly, airways were laid out and Air Service pilots flew on these airways regularly. Assistance and advice were given to municipalities in planning airports and encouraging development. Furthermore, information has been published in relation to the formation of airports and emergency landing fields. As an example of the extension of this work, it is interesting to record that when the Airways Section was first created there were 1350 landing facilities listed. After the first year's operation the Section had increased this number to 3500 organized and unorganized landing fields throughout the country.

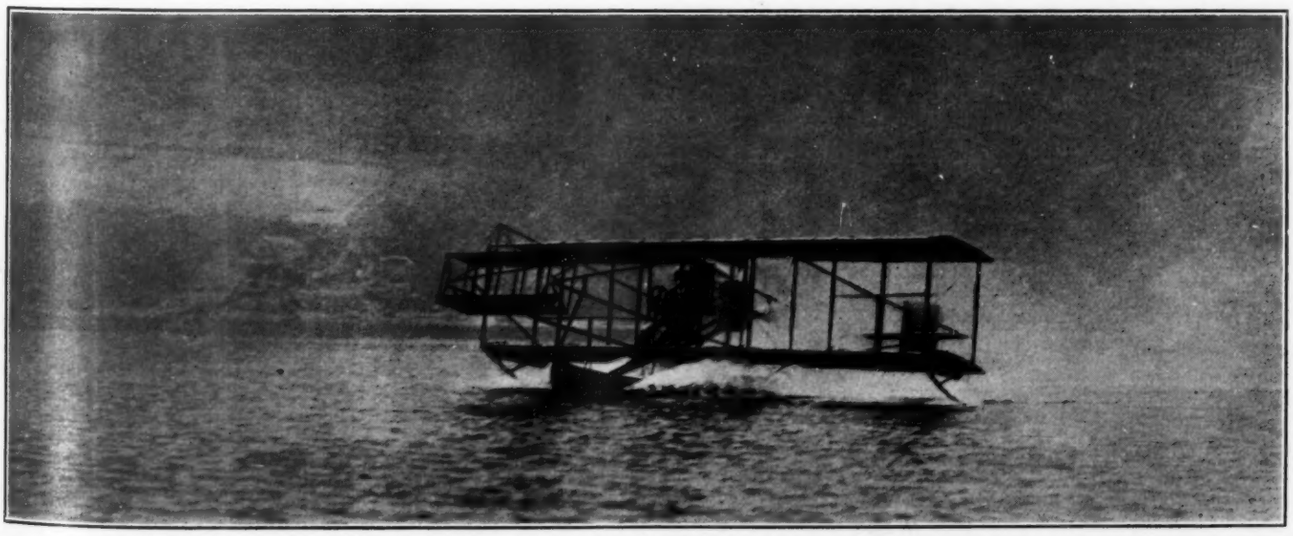
Forest patrol work was started with the cooperation of the Army Air Service in 1920 when a few airplanes were lent with personnel to the Forestry Service, and, as a result of the patrol work carried out, there was saved from destruction by fire timber valued at approximately $35,000,000. Between 900 and 1000 fires were reported from the air and successfully fought with ground apparatus under direction from the airplanes. This work which had been first experimented upon in 1919, was carried out in Oregon and California, principally, by the Aerial Forest Patrol which was formed as an integral part of the Forestry Service though remaining under the direction of the Air Service. A great deal of this work was under the direction of Capt. Lowell Smith, well-known now as the commander of the Round-the-World Flight of the Air Service in 1924.

This work led to the extensive use of the airplane in surveying and prospecting timber land, a class of aerial service which is being carried on to a considerable extent by commercial operators today. To the Air Service is largely due the credit of instigating these activities. In a similar manner the Air Service, in 1919 and 1920, cooperated with the U.S. Coast and Geodetic Survey in making maps and charts with the aid of aerial photography. In another sphere, considerable pioneer work was carried on commencing in 1923 in the work of combatting the insects which infest cotton and other plants and crops. In cooperation with the Department of Agriculture, the Air Service developed the method of crop dusting from airplanes and small airships to a place where private enterprise could enter and make the work a profitable business.

In technical development, the Army Air Service has contributed in very large measure to the aeronautical progress of the World during the period since the War. In cooperation with the aircraft industry, the Army Air Service has concentrated on developing the performance of aircraft to a very high pitch with the result that during the past six years the large majority of the World airplane records have been brought to America, and this development has, in turn, resulted in the Air Service being equipped, in part at least, with airplanes unsurpassed in performance by those of any other nation. The Round-the-World Flight which started on April 6 and ended successfully on Sept. 28, 1924, is one characteristic of both personnel and technical development. Production of equipment, however, has not been the general policy, with the result that the Service has been vitally underequipped with modern planes in spite of the fact that such were readily available.

This condition, and the deplorable condition in which it placed the aircraft industry, has been the subject of no less than twelve or thirteen aircraft investigations. The most important of these investigations have been those of the Lassiter Committee, appointed to consider the needs of the Air Service on Oct. 11, 1923, the Lampert Committee, officially known as the Select Committee of Inquiry into the Operation of the United States Air Services, authorized on March 24, 1924, and, finally, the President's Aircraft Board, appointed by President Coolidge, on Sept. 12, 1925, and making its report on Dec. 2, 1925. The latter two investigations especially produced some extremely valuable information and may well be considered to have been responsible for the passage of the Army Air Bill through Congress just recently. As a result of this Bill, an adequate appropriation is made for a five year procurement program in the Air Corps, the new name given the Army Air Service by the Bill. Provision is made for adequate and up-to-date equipment and the methods of contracting for the supply of this equipment by the aircraft industry are provided for. And, furthermore, the actual status of the air officer is definitely laid down.

In conclusion, it can be said that the strides made by the Air Corps since the War have been very great indeed, although the service has been through extremely difficult times.



The Father of the Seaplane. Curtiss biplane mounted on a canoe and undergoing tests at Hammondsport, N.Y., in 1910.

Naval Aviation—Its Modern Mission

A Brief Discussion of the Problems to be Met.

By EDWARD P. WARNER
Assistant Secretary of the Navy for Aviation.

THE DUTIES of the new Assistant Secretary of the Navy who "shall, under the direction of the Secretary of the Navy, be charged with the supervision of naval aeronautics and the coordination of its activities with other governmental agencies" are not yet fully developed, but it is manifest from the present status of the aeronautical art and the present situation of aeronautics in the service that problems of procurement of equipment must be much to the fore. All other reasons aside, those problems would be thrown into bold relief by the establishment by Congress of a new legal basis for procedure just as new programs for continuity of production over a series of years are being planned. The new legislation frees the relations between the department and the purveyor of aircraft and equipment of some of the restriction existing in the past, and it provides also for a certain coordination of governmental agencies in the consideration of design and invention. One specific function given to a Board composed of the three new Assistant Secretaries in War, Commerce and the Navy is the examination of patents and designs submitted for consideration and the passing of judgment upon their usefulness to the Government.

It is well that there should have been legislation now aimed to clear up any defects inherent in the procurement methods formerly available, for the obsolescence and gradual retirement of war-time designs is putting the Navy's service equipment definitely on a post-war basis, where procurement of standardized types at a substantially constant rate can be organized without regard to the desirability of making use of large stores of serviceable machines and engines already accumulated. The problem of the transition period, extending over a number of years, from a war status in respect of equipment to a definitely post-war one has had to be faced by every service in every country.

Standardization of type itself becomes increasingly practicable with the passage of time, as increasing experience in the application of the principles of aeronautical engineering steadies the rate of development and makes it possible to plan for changes and modernization of types at comparatively regular intervals. Nowhere is standardization more necessary than in the Navy, where each group of vessels using aircraft must be a largely self-sustaining unit. Nowhere was it more difficult in the early stages after the War, when there were superimposed on the ordinary problems of design those of the adaptation of airplanes to service with the fleet, just then being started, since the anti-submarine operations during the War were carried out from shore bases. It, of course, continues true that the special needs of the fleet have always to be taken into account in selecting types of aircraft and in planning for their procurement. Some types are entirely special, with no counter-parts outside the naval service, and all are particular to that service in some degree. When landplanes are to be used problems of flotation gear, arresting gear, convertibility to seaplanes in a minimum time in case of need, and strengthening against catapult and arresting stresses have all to be reckoned with. They cannot be put aside, for there must be naval aviation to go with the fleet and base on the fleet wherever ships can navigate. The theory of a Navy as a group of movable forts defending the immediate coast line has held in some places and at some times, but it has no place in the United States and under modern conditions. The adaptation of aircraft to sea-going life and their constant improvement to guarantee their greater utility in all their functions of defense and offense at sea and in coast defense offers the most fascinating opportunity for any one, officer or civilian, privileged to be associated with the work.

An Outline of Aeronautical Development

AVIATION'S Birthday the Zero Hour of Aeronautics in the United States.

By MAJOR JOHN F. CURRY
Chief, Engineering Division, U.S. Air Corps.

THE TENTH anniversary of the founding of AVIATION is a propitious time to consider what this decade has given to the world to advance the art of flying.

The development of aviation in the United States, for either military or commercial purposes, was negligible until 1916. The position of the United States regarding airplane development was accurately indicated by the place it occupied among the nations of the world in aircraft appropriations. The following table of appropriations for five years, following the Wright's demonstration at Fort Myer in 1908, is illuminating:

Germany	$28,000,000
France	22,000,000
Russia	12,000,000
Italy	8,000,000
Austria	5,000,000
Great Britain	3,000,000
Belgium	2,000,000
Japan	1,500,000
China	700,000
Bulgaria	600,000
Greece	600,000
Spain	550,000
Brazil	500,000
United States	435,000

In 1916, the United States Army made its first attempt to use airplanes in conjunction with military activities. That was in the punitive expedition into Mexico. The Pershing expedition, with its long tenuous line across the sands of northern Mexico, afforded the first practical demonstration of the value of aircraft for reconnaissance in the history of the American service, and showed, as nothing else could, the vital necessity of airplanes.

Primitive Equipment

The first Aero Squadron was equipped with eight old and low-powered training planes, and the theater of operations was so difficult they soon came to grief. These planes, with a ceiling of 7500 ft., encountered 12,000 ft. mountains; the distances covered were tremendous for that type of plane and the landing fields were rough.

The expedition was, later, provided with twelve airplanes of a later design, and greater power. A great amount of scouting over country in which cavalry and infantry could not operate was carried out, and the first regular air mail route maintained by the United States was opened over the 110 miles from Columbus to Field Headquarters at Colonia Dublan, the airplanes covering the distance in sixty-six minutes. On August 22, 1916, the first aerial review ever held by the United States Army passed before Brig. Gen. John J. Pershing, "somewhere in Mexico".

The success of aviation in Mexico had its effect in Washington. It brought about the first appreciable aviation appropriation ever made in the United States, for $13,281,666 enacted August 29, 1916.

Nineteen sixteen, therefore, the natal year of AVIATION, may also be considered the zero year of aviation development in the United States. In spite of the fact that we were on the threshold of war in 1916, the Army's Aviation Section consisted of but three Majors, nine Captains, thirty-three First Lieutenants and four hundred and fifty-eight enlisted men.

The aircraft industry at that time was making its first struggles to be recognized as an industry, and until the passage of the thirteen million dollar appropriation of 1916, had practically built itself on the war orders for training airplanes used by the British.

The War Appropriations

Then came the embarrassment of riches. A war appropriation of six hundred and forty millions for aviation, when starting from zero is indeed an embarrassment. Dr. Wolcott, of the National Advisory Committee for Aeronautics, said at that time:

"Though millions may be available for a specific purpose in time of great need, no amount of money will buy time. Even the most generous preparations do not open up the years that have passed and enable us to carefully lay the foundation of great industry and a great aerial army through the education of engineers, manufacturers, teachers and all the wide variety of personnel required."

Here indeed, although unrealized at that time, lay the crux of the situation. America, with all the apathy of peace, had been outdistanced by the belligerents in the science of aviation. It is easy to appreciate now that the lack of realization of the engineering and industrial difficulties was one of the great causes of America's late start.

With a full appreciation of the difficulties involved in organizing an industry, securing materials, and mobilizing and training personnel, it is safe to say that our principal stumbling block was engineering ignorance.

Only a handful of engineers in the United States were capable of designing even a training airplane, and not one had any conception of the difficulties involved in designing a fighting airplane. It was necessary, in the emergency, to attempt to copy designs furnished by the Allies.

A Great Problem

It should be said, in justice to the men responsible for the wartime program, that they moved mountains in carrying out their allotted tasks, and, by the time the Armistice was signed, had regained for the United States its place in the aviation world.

The aircraft program of the War would stand as a failure only if the United States neglected to analyze the causes of that failure, and refused to act to prevent a recurrence. The establishment and encouragement of the Engineering Division of the Air Corps is evidence that we are profiting by this failure.

In 1926, after ten years of extensive study, we may feel inclined to review the plebian efforts of that grade school stage with the lofty superiority of the high school "man". However, we are just emerging from our sea of ignorance, and have yet to take up our collegiate work.

Aeronautics, as in other fields of learning, impresses those best informed on the subject, that the greatest developments that have been accomplished, are as nothing compared to the possibilities of the future. The past ten years of work has simply kept us abreast of the world in engineering, and history will undoubtedly record this decade as the period of the military airplane. The next decade will undoubtedly be conspicuous for its development and encouragement of commercial aviation.

Military Aviation to Lead Commerce

Military aviation must always of necessity be well in advance of commercial practice and this is an extremely valuable asset to an industry financially unable to prosecute the research and development work necessary to maintain leadership.

The development of materials that will increase the strength or decrease the weight of aircraft, the increased reliability of engines, the aerodynamic studies producing better performance, the structures studies furnishing more accurate methods of determining stresses are contributions of the Military decade to the Commercial decade that are invaluable.

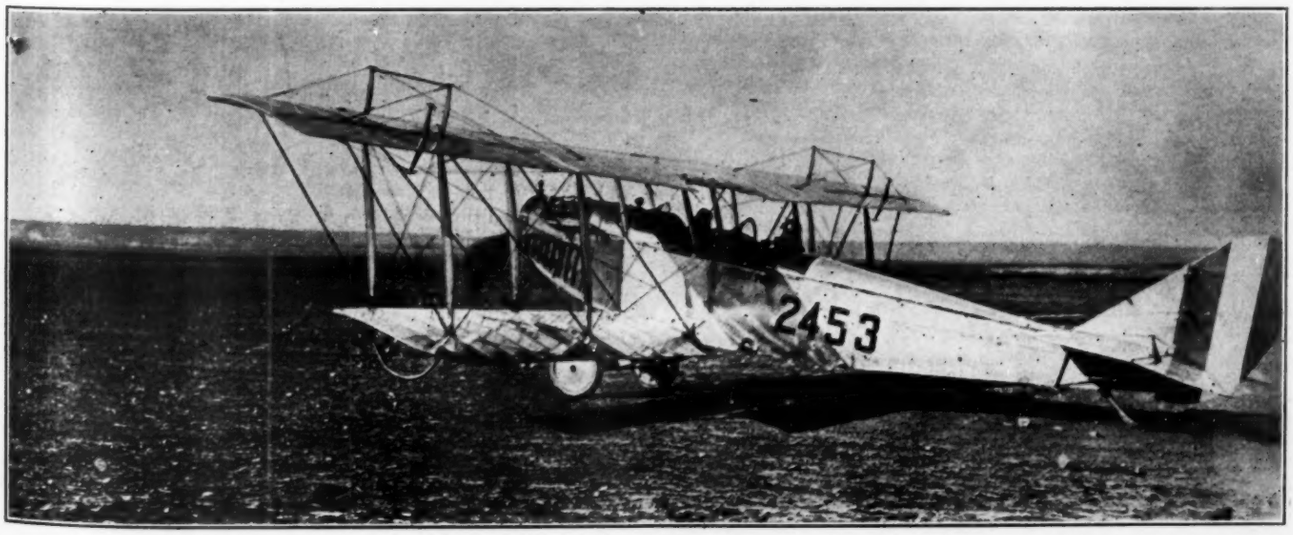
Speed is Primary

The new comercial aviation, in order to be recognized with the other firmly established methods of transportation, must take into consideration the existing competition and be prepared at all times to maintain its inherent advantage—speed. This means accessible terminals, reliable equipment, and the ability and facilities for flying day and night, and under almost any weather conditions.

The night flying equipment and radio beacon, developed by the Engineering Division of the Air Corps, and used by the Air Mail, will be essential on any well organized commercial air route.

Tremendous advances have been made since 1916, but the greatest work is ahead. In experimental aviation, at least, the United States is now abreast, if not ahead, of the World but the position is not at all a sinecure. Other great nations are spending considerably more money for aviation.

It is hoped that the aviation experience of the War and the paternal feeling the United States should have toward the airplane, will always save us when this country is in danger of becoming a first-class nation with a second-class Air Corps.



An Army Curtiss JN-4D, in service 1918

A History of U.S. Naval Aviation

Aviation in the Navy From its Earliest Days.

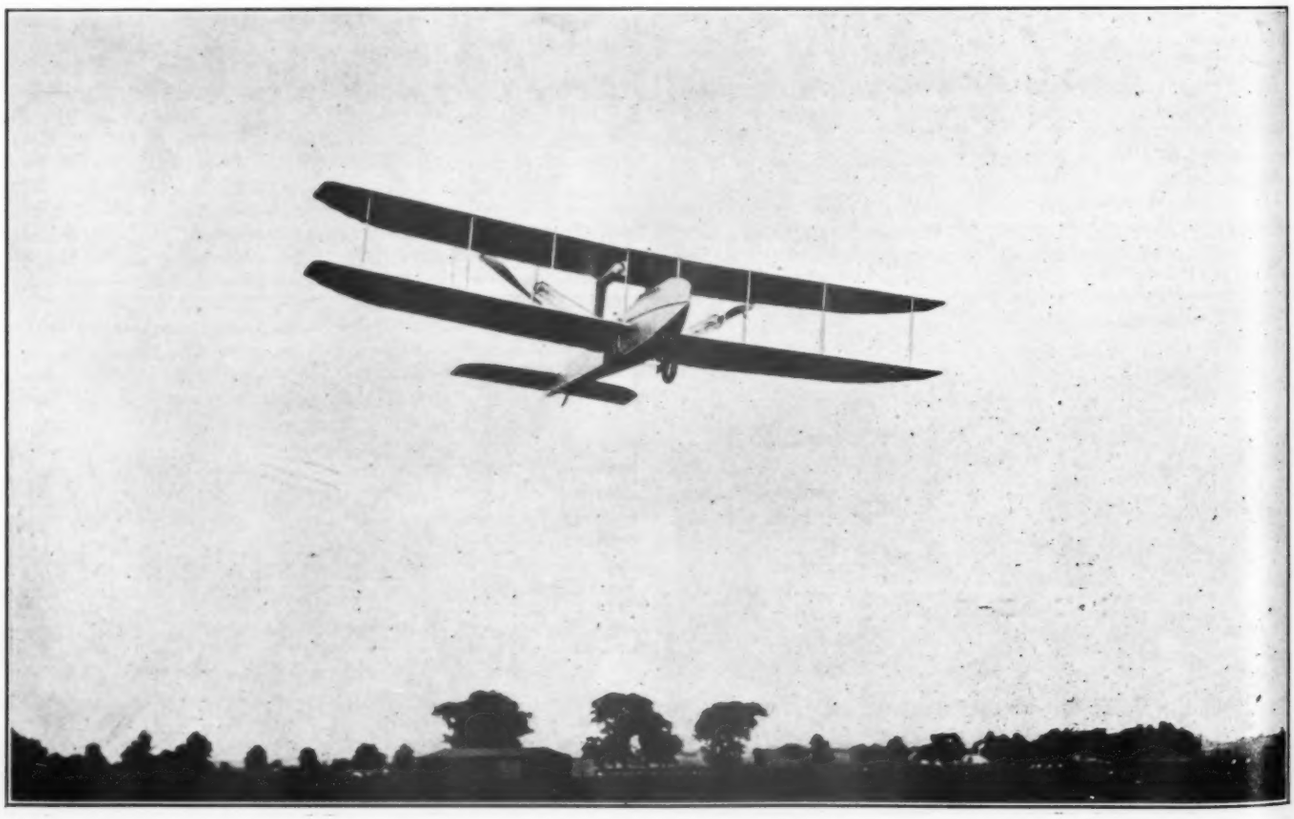
THE UNITED STATES NAVY first investigated the possibilities of aviation for naval purposes when, in 1908 Lieut. G. C. Sweet and Naval Constructor McIntee were sent as observers to the Army tests of the Wright plane at Fort Myer, Va. The first real naval activity in aviation, however, came late in 1910. Lieutenant Sweet had unsuccessfully tried to interest the authorities in the possibilities of fitting pontoons to the Wright machine and interest died until, in 1910, Captain W. I. Chambers, U.S.N. who was Assistant to the Aide for Material in the Bureau of Equipment, attended the aviation meets at Belmont Park, N. Y. and at Halethorpe, near Baltimore, as official observer. Captain Chambers immediately appreciated the potential value of the airplane to the Navy just as Lieutenant Sweet had done two years before and endeavored to interest the Wright's in arranging for a flight off a battleship. Wilbur Wright declined to make the attempt but the Curtiss Company agreed to try it and, accordingly, Nov. 14, 1910, was set for the trial. The Curtiss representative, Eugene Ely was the pilot and he was successful in flying a 50 hp. Curtiss landplane off a platform hastily rigged up on the bow of the U.S.S. Birmingham at Hampton Roads, Va.

Following this successful experiment, Glenn H. Curtiss offered to instruct several naval officers free of charge as no money had then been appropriated by Congress for naval aviation. Accordingly, Lieut. T. G. Ellyson, U.S.N. was sent to the Curtiss Camp at San Diego, Cal., in December, 1910. Continuing his experiments, Mr. Ely, on Jan. 18, 1911, made a successful landing in an airplane on the deck of the U.S.S. Pennsylvania, in San Francisco Harbor, and the next day he flew his airplane away again from the deck on which he had previously landed. During this time, Glenn H. Curtiss, together with Lieutenant Ellyson, had perfected a pontoon attachment for airplanes and, on Jan 26, 1911, Mr. Curtiss flew from the water at his San Diego base, landed along side the U.S.S. Pennsylvania and was hoisted aboard ship, subsequently to be hoisted out again and to fly back to his base.

As a result of Captain Chambers' reports and recommendations on aviation, the first naval aviation appropriation, amounting to $25,000, was included in the 1911-1912 Naval Appropriation Act. On March 13, 1911, Captain Chambers was assigned to the Bureau of Navigation and devoted all his time to aviation and the coordination of the aeronautical work of the various bureaus. Captain Chambers had no small task against the difficulties which always present themselves to those to whom fate assigns the difficult problem of injecting new ideas into a staid and elderly organization. The Navy, as a whole was not interested and Captain Chambers worked alone and unassisted to build up a naval aviation establishment.

Early in 1911, Lieut. John Rodgers, U.S.N. (now Commander, U.S.N. and Asst. Chief, Bureau of Aeronautics, and well-known as the commander of the Hawaiian flight of last year.) Lieut. John Towers,. U.S.N. (now Commander, U.S.N.) and Ensign V. D. Herbster, U.S.N. were ordered to the Curtiss and Wright companies for flying instruction. Two Curtiss planes and one Wright plane were purchased and, in the Summer of 1911, the first naval aviation unit was formed and an aviation Camp established at Greenburg Point, near Annapolis, Md.

In relating naval air history, it is interesting to note that the first naval flight of any count was that performed by Lieutenant Rodgers who flew from Annapolis to Washington and then to College Park, from which place he later returned to Annapolis via Baltimore and Havre de Grace. Quite a lot of flying was then being carried out by the few



Wright Model F, one of the first fuselage planes, in flight over Simms Station, near Dayton, O., 1914

naval fliers that there were and in 1912, Lieutenant Towers established a World record for endurance of seaplanes by remaining in the air 6 hr. 10 min.

Another notable landmark in the development of naval aviation occurred in 1912 when the first catapult was designed at the Naval Gun Factory, Washington, D.C., under the supervision of Captain Chambers. The first trial, with Lieutenant Ellyson as pilot of the plane, was unsuccessful and the catapult was redesigned by Naval Constructor Richardson (now Commander, U.S.N. and Head of the Design Branch, Bureau of Aeronautics, U.S. Navy) and Lieutenant Ellyson was successfully catapulted from this second catapult on October 12, 1912. The experiment was carried out from a large float in the Washington Navy Yard.

Another important event of 1912 was the construction of the Navy Aerodynamic Laboratory at the Washington Navy Yard. A wind tunnel of the Götingen type was constructed. In the meantime Naval Constructor Richardson continued to give close attention to the problems of aviation and carried out a long series of model basin experiments in the design of pontoons, which experiments have been very largely responsible for much of the knowledge possessed at this time on the design of seaplane pontoons.

Naval Airplane Deliveries

In the Summer of 1912, a Burgess Wright seaplane was delivered to the Navy and also an improved Curtiss seaplane. Later in the year, the first Curtiss flying boat was delivered. It was this plane which was used largely in the catapult experiments. During 1913, four more planes were delivered, namely, two Curtiss flying boats, one Curtiss amphibian and one Wright seaplane. All these planes were of very low horsepower compared with modern ideas. Early in 1914, three more Curtiss flying boats of improved type were delivered and one Burgess-Dunne, the type of plane with the swept back wings. Machines continued to be ordered in small quantities until, in 1916, 60 odd planes were delivered of various types of considerably higher power than the early planes. In the Autumn of 1916 the Navy's first production order was placed with the Curtiss Company for 30 type N-9 training machines. These figures serve to give some idea of the extent of the early naval aviation operations.

Referring back to the historical sequence, it should be noted that Marine Corps aviation had its inception when, on May 21, 1912, Lieut. Alfred A. Cunningham, U.S.M.C., joined the four Navy pilots who, at that time comprised all there was of naval aviation. Shortly after, several enlisted marines were ordered to aviation duty, forming the nucleus of the present Marine Corps section of naval aviation.

It would seem that the first serious step taken by the Navy to develop aviation was the appointment of a Board of Aeronautics in October, 1913, with Captain Chambers as chairman. The duty of the board was to report on the needs of a suitable aeronautical organization and establishment for the Navy. One of the first important recommendations of the Board was for the establishment of an aviation station at Pensacola, Fla., and, accordingly, the first Navy Air Station was created in January, 1914. At the same time, all the aviation equipment at Annapolis was transferred to the U.S.S. Mississippi and the vessel ordered to Pensacola and turned over to aviation so that the air operations might be kept in touch with ships. Lieutenant Commander Mustin was assigned to aviation and became the first commander of the Pensacola Air Station. In December, 1913, Captain Chambers was succeeded in charge of aviation by Capt. Mark L. Bristol.

All this activity had been going on but, up to this time there had been no opportunity of actually applying the small aviation force attached to the Navy in any practical manner in order to determine its efficacy. The opportunity came, however, in April, 1914, when the Atlantic Fleet was ordered to Mexican waters in connection with the occupation of Vera Cruz. A naval aviation division consisting of two airplanes completely manned and equipped was attached to the U.S.S. Mississippi which was sent to Vera Cruz, and another was attached to the U.S.S. Birmingham which was sent to Tampico. The two planes at Vera Cruz were used continuously and, although these planes were not fitted for overland work, for forty-three days they carried on valuable scouting work over the trenches, assisting in the protection of the city of Vera Cruz.

Naval flying had developed considerably by this time, comparatively speaking, and in June, 1914, Lieutenant Towers was sent to Hammondsport in connection with the construction of the twin-engine flying boat "America" with which it was planned to attempt a flight across the Atlantic Ocean. The outbreak of the War in Europe interrupted this project but, as is now well-known, Lieutenant Towers had his dream partially realized in more recent years. The "America" marked the beginning of large flying boat construction in the United States.

During this time practically no attention had been given to lighter-than-air development but a start was made in this direction on April 20, 1915 when the Navy bought its first airship, the "D-1", a non-rigid, which was purchased from the Connecticut Aircraft Co., of New Haven, Conn., but more will be said of lighter-than-air activities later.

Probably as a result of the extensive activities in aeronautics during the War in Europe, the Navy became very much more concerned with aviation and some radical changes were made in the administration of naval aviation in Washington during 1916. On March 1 of that year, the direction of aviation activities was removed from the Bureau of Navigation and transferred to the office of the Chief of Naval Operations where an aviation desk was placed under the Aide for Material and Lieut. C. K. Bronson placed in charge. It was unfortunate, however, that Lieutenant Bronson, who was an active flier, lost his life in an airplane accident in November, 1916, and Lieutenant Towers, who, during 1915 had been Assistant Naval Attache, in the American Embassy in London, was assigned as Assistant for Aviation in the office of the Chief of Naval Operations. Lieutenant Towers was still filling this post when the United States declared war on Germany on April 6, 1917. A month after War was declared, however, Capt. Nolbe R. Irwin, U.S.N., assumed the post of Assistant for Aviation and held the position until March 7, 1918, when the Office of the Director of Naval Aviation was created by a Navy General Order and Captain Irwin was the first Director and was in full charge, responsible only to the Chief of Naval Operations.

The War Nucleus

When America entered the War, the Naval Air Service personnel consisted of 38 officers, 163 men and the one air station at Pensacola, Fla. The aircraft in commission comprised 45 pontoon seaplanes, 6 flying boats, 3 land machines, 2 kite balloons and the one non-rigid airship, D-1. The seaplanes were mostly obsolescent, capable only of short flights over water and were distinctly deficient in seaworthiness qualities. It was then that the Naval Reserve Flying Corps, created by the Naval Appropriation Act of 1916, proved such a valuable nucleus. As soon as it became evident that the United States would enter the War, certain groups of college men got together and applied for enrollment in the N.R.F.C. It is particularly interesting at this time, in view of the recent nomination of F. Trubee Davison as Assistant Secretary of War for Aviation, to note that the first group of these college men in early 1917 to apply for enrollment was under the lead of Mr. Davison. The group consisted of 29 men who immediately began their training in their own seaplanes and entirely at their own expense at Pensacola. The zeal and enthusiasm of these men resulted in naval aviation having available very shortly after war was declared, a nucleus of very capable young flying officers who proved of inestimable value in the building up of the service.

The immediate naval air program on entry into the War might be summed up under the two headings,—training and procurement of equipment. In training, a system was drawn up which required all student air officers to pass through a routine of ground school, elementary flight training and, finally, advanced flight training. The first ground school was started at the Massachusetts Institute of Technology in September, 1917, under the direction of Lieut. J. C. Hunsaker (now Commander, Construction Corps, U.S.N., and Asst. Naval Attache, American Embassy, London.) Elementary flight

training was carried on at Bay Shore, Miami, Key West and San Diego, while advanced flight training was given at Pensacola. Pilots for lighter-than-air work went to M.I.T. as ground school and then on to Akron, Ohio, for elementary training in free and kite balloon work, finally ending up for advanced training at either Pensacola (for airship pilots) or Rockaway, L.I. (for kite balloon pilots).

In administering the program for production and purchase of equipment, several boards and committees were elected, in the main joint boards between the Army and Navy in order to avoid duplication and congestion. Among these was the Joint Technical Board on Aircraft created on May 5, 1917. The original members of this board were Major Benjamin D. Foulois, Capt. V. E. Clark and Capt. E. S. Gorrell, of the Army and Lieut. A. K. Atkins, Lieut. J. H. Towers and Lieut. J. C. Hunsaker of the Navy. The function of this board was to advise the War and Navy Departments on the purchase of types of aircraft engines. A vast number of other technical matters were also referred to the Board. This Board prepared for the Navy a building program which provided for 1185 single Liberty engine HS-1 flying boats, and 235 twin Liberty engine H-16 flying boats. Both these were Curtiss developments, the H-16 being the outcome of the "America" already mentioned.

The production of naval planes in appreciable quantities was first reached in April, 1918 at which time the single engine flying boats were being received at the rate of six per week and the twin-engine machines at the rate of three per week. This rate very soon increased until, in September of that year, the production was 38 per week in the first case and 13 per week in the second. Of course, considerable experimental work was also being carried out in new designs.

Naval Aircraft Factory

One of the greatest problems which had to be met by the Navy in connection with its production program was that of obtaining sufficient contractors in the industry to maintain the deliveries of equipment. The requirements of the Army were so great that the comparatively small quantity of machines called for by the Navy could not adequately be handled. Consequently, with a view to assisting in the carrying out of the production program and also for the purpose of carrying on experimental production of aircraft, the Navy Department, in June, 1917, directed Lieutenant Commander Coburn, Construction Corps, U.S.N., to make a survey with a view to the building up of a naval factory which later became the Naval Aircraft Factory, at Philadelphia, and Commander Coburn was detailed as the first Manager of the factory, on November 28, 1917. The original cost was approximately $1,000,000 but later it was found advisable to enlarge the Factory at an approximate cost of $3,750,000, the extension being available by July, 1918. The output of the Factory up to Nov. 11, 1918, when the Armistice was signed included 183 twin engine patrol flying boats, with 50 sets of spares.

In May, 1917, at the request of the French Government, the "First Aeronautic Detachment, U.S. Navy" consisting of seven officers and 122 men under the command of Lieut. Kenneth Whiting, U.S.N., arrived in France, and in September of the same year the Navy Department authorized eleven Naval air stations in France, under the command of Capt. H. I. Cone, as Commander, U.S. Naval Aviation Forces, Foreign Service, relieving Lieutenant Whiting who went to English stations. The first American patrol of the French Coastal Unit of U.S. Naval Aviation was made at Le Croisic on Nov. 13, 1917. This unit, operating for an effecting period of nine months, sighted 27 submarines, attacked 25 and probably sank 4. In addition, a number of drifting mines were discovered and destroyed.

In February, 1918, the first American Aviation detachment arrived in Italy and was stationed at Bolsena and later stations were formed at Porto Corsini and Pescara.

The U.S. Naval Aviation operations in the British Isles were carried out by seven stations, two in England and five in Ireland. The two English stations were at Eastleigh and Killingholme. The latter station was a patrol station and carried out 233 patrols during the War and convoyed 6243 Allied vessels at sea. The Eastleigh station was used for the maintenance of planes of the Northern Bombing Group. The Northern Bombing Group was organized for bombing the German submarine bases in northern Belgium. It consisted of eight squadrons assigned equally to day and night work, the daytime operations being carried out by the Marine Corps and the night bombing by the Navy. The planes employed were Handley Pages and Caproni bombers for night bombing and DH-4's and DH-9A's for day bombing.

At the time of the entrance of the United States into the War, the Marine Corps section of Naval Aviation consisted of 5 officers and 30 enlised men stationed at Pensacola. It was realized that a large part of the flying duties of the Marine Corps would be over land so that, accordingly, a combination land and sea station was formed at the Navy Yard, Philadelphia, for Marine Corps fliers. Air operations in the Marine Corps grew rapidly and on July 13, 1918, the first Marine Aviation Force, consisting of Squadrons A.B. and C. and Headquarters Company, left Miami, Fla., for France. This organization consisted of 109 officers and 657 men. They proceeded to airdromes situated between Calais and

Naval lighter-than-air activity. The Los Angeles flying over the New Jersey shore.

Dunkirk. The total number of raids made by Marine Corps personnel was 57, during which 52,000 lb. of bombs were dropped. They used, largely, DH-4's and DH-9A's. With a view to giving some idea of the growth of Marine Corps aviation during the period America was in the War, the following figures are interesting: On April 6, 1917, there were in the Marine Corps Aviation Section, 4 officers, 1 warrant officer and 30 enlisted men. On Nov. 11, 1918, these figures had increased to 250 officers, 32 warrant officers and 2180 enlisted men.

The War proved that the main functions of aircraft in connection with naval operations, considered apart from the operation of aircraft as an individual unit, are scouting and gun spotting in connection with fleet work at sea, coastal patrol work and offensive action against enemy aircraft, surface ships and coastal batteries. The Navy developed these branches extensively. Coastal patrol work was carried on in part by lighter-than-air craft as well as by seaplanes. As already stated the first airship possessed by the Navy was the D-1 which, though ordered in April, 1915 was not delivered until April, 1917, and was, to a large extent, a failure, being far over weight. It was only flown a few times and then deflated and later broken up. Eventually the B class non-rigid was designed and deliveries were made during the latter part of 1917 and the early part of 1918. The Goodyear Company, which constructed a number of these ships, also trained the first naval airship detachment under the command of Comdr. L. H. Maxfield, U.S.N. These pilots had little direct War experience, being all employed on this side of the Atlantic. However, these B class airships trained 170 pilots and, on coastal patrol, did 13,600 hr. or some 400,000 miles without a fatality.

The development of naval aeronautics in the United States had made enormous strides at the time the Armistice was signed. The personnel of the Naval Air Service was composed of 3,117 officers, and 45,632 men. There were 42 air stations in commission, 25 of which were located in France, Great Britain and Italy.

Shortly after the War, the operations of Naval Aviation were of necessity considerably curtailed as were those of the Army Air Corps. Training and technical development was the general policy, together with experimental work in the operation of seaplanes with ships in order to determine the exact value of aircraft to the fleet and its efficacy against a fleet.

The Bureau of Aeronautics of the Navy Department was established on August 10, 1921, and divided into four divisions, namely, Plans, Administration, Material and Flight. Rear Admiral W. A. Moffett was created the first Chief, Bureau of Aeronautics and has held this post to date.

The outstanding developments in naval heavier-than-air since the War are characterized by the Atlantic and Pacific flights. As already recorded the Atlantic flight was planned before the War and it was as a result of the development work carried on during the War in the design of large patrol planes that the N.C. were perfected in 1919 to a state which warranted the attempt at the Atlantic crossing. Accordingly, on May 8, 1919, the NC-1, NC-3 and NC-4 left Rockaway, L.I., for Halifax, N.S. on the first leg of the Atlantic flight under the command of Commander Towers, in the NC-3, with Lieut. Comdr. P.N.L. Bellinger (NC-1) and Lieut. Comdr. A. C. Read (NC-4). As is now well-known, the NC-4 was the only one of the three to get beyond the Azores, the weather being extremely bad. History somewhat repeated itself in the Hawaiian flight of 1925 when Commander Rodgers was forced down in the PN-9 No. 1 and sailed the high seas for nine days before coming in sight of his destination. The PN-9, No. 2, under the command of Lieut. A. P. Snody, was forced down a few hundred miles from the California coast with slight engine trouble.

Undoubtedly the most notable and far reaching activity in naval aviation since the War has been the bombing experiments carried out during June and July of 1921. A number of German naval ships had been turned over to the United States and, as a result of a controversy raised primarily by General Mitchell before the House Appropriations Committee in which he held that airplanes could sink battleships and that, therefore, it was useless to spend large sums on new men-of-war, some of these German ships were put to valuable use in providing targets with which to prove the truth of General Mitchell's contentions. The tests were carried out in the presence of Congressmen from Washington and the Army and Marine Corps cooperated with the Navy in bombing the cruiser Frankfurt, the dreadnought, Ostfriesland and a number of smaller Ex-German vessels. In all cases, including that of one submarine, the bombs sank the ships within a short time after the attack, and the tests served to provide some idea of the possibilities of using airplanes against surface ships, although allowance had, of course, to be made for the fact that the airplanes in the 'attack' were entirely unmolested, which would not be the case in actual warfare. The tests, however, have been the subject of a tremendous amount of discussion both in this country and abroad and have provided valuable data.

The watchman at Lakehurst Naval Air Station, keeping an eye on the weather on the horizon. The Los Angeles is at the mast in the background.

The first torpedo plane practice in the history of the United States Navy was staged off the Virginia Capes on Sept. 27, 1922. Twenty torpedo planes took part in maneuvers which consisted of locating a fleet at sea and attacking it, eighteen of the twenty planes carrying torpedos. No defense was put up with the exception of the maneuvering of the surface ships and, out of seventeen torpedos launched, seven hits were credited to the seaplane squadron.

In lighter-than-air work the Navy has been particularly active. The program in general has consisted of operating the two rigid airships, the Shenandoah (until she was wrecked in September, 1925) and the Los Angeles, one non-rigid for training purposes and a number of free and observation balloons also for purposes of training. This program is, in general, being maintained and, with the program ahead, is likely to be extended.

The Navy Aviation Bill which has recently been passed provides for naval aviation in much the same way as the recent Army bill provides for military aeronautics. It provides for a five-year procurement program with an appropriation of $85,078,750 and includes provisions for two large rigid airships and an experimental metal-clad airship of small size. The Navy has been responsible for cooperating in the development of some advanced airplane designs with the aircraft industry and, in the development of air-cooled engines, which are well suited to the Navy's air requirements, very material advances have been made. The new program holds out a favorable outlook for the future.

A Review of the American Aircraft Industry

The Steady Growth of the Industry a Sign of Stability.

IT WOULD be totally inaccurate and unfair to consider the age of the American Aircraft Industry as dating back only to the extent of the past decade, the conclusion of which AVIATION is now celebrating. Small though it was, the Aircraft Industry, if such it might then be called, was building and selling airplanes at least fourteen years ago. According to the dictionary definition, an industry is a branch of trade or manufacture and with this construction placed upon it, it would seem to be reasonable to carry the birthday of the American Aircraft Industry back to the days when the Wright Brothers and Glenn H. Curtiss first began constructing airplanes for sale. As recorded elsewhere in these columns, Orville Wright first sold an airplane to the United States Government in July, 1909, and since the deal was a purely commercial one it seems reasonable to consider the nucleus of the American Aircraft Industry in existence at that time.

Pre-War Production

At that time, as it has been since, the Government of this country—and certain foreign governments—was the chief customer in the purchase of aircraft and it will be interesting to set down the actual purchases of airplanes by the United States Government from the time of the first purchase of the Wright biplane up to the year 1916 when the Army placed its first production order. During the years, 1909-1916, the industry delivered to the Army alone, 142 airplanes, according to the following table:

Year	*No.*	*Type*
1909	1	Wright
1910	0	
1911	7	Wright, Burgess and Curtiss
1912	12	Wright, Burgess and Curtiss
1913	8	Curtiss and Burgess
1914	11	Wright, Martin, Curtiss, Burgess
1915	20	Martin, Curtiss, Burgess
1916	83	Curtiss, Standard, L.W.F., Martin and Sturteyant
Total	142	

Only a small number of firms were then making airplanes and engines. The planes were mostly of the training type and not very suited to War service. Yet America somewhat suddenly found herself at war and in April, 1917, the demands upon the Aircraft Industry were colossal. With practically no industry as a foundation, little experience in the design and construction of war type planes and engines and no manufacturers of suitable instruments, clothing, cameras and other items, and with a distinct shortage in many raw materials, the result was almost astonishing. The manual forces of the industry rapidly grew from but a few thousand to no less than 175,000 men and women at the time of the signing of the Armistice. According to military statistics, after only 17 months, the production of airplanes was at the rate of 19,884 per year. Typical of the entire undertaking is the fact that in less than six weeks after the initial step was taken in the design of the Liberty engine, the first engine was built complete and delivered in Washington. It was extended into a twelve cylinder engine and the first one built and passed its fifty hour test a little over a month later and was put into production. By the end of November, 1918, over 32,000 engines of all kinds had been delivered and put into service and the rate of production on engines was 64,000 annually.

Since the War, many radical changes have taken place in the condition and constitution of the Aircraft Industry. Many companies have completely disappeared while others have continued in growth and experience,—the latter especially so in view of the distressing conditions through which the Industry has passed,—and new companies have been created. Governmental orders have, at times, been scarce and the Industry has had a hard time to keep itself from sinking, but one thing can always be claimed with the greatest credit reflected and that is, that whenever the Services have clearly and definitely stated their desires, the Industry has been ready to cooperate and contribute invariably for more than a fifty per cent share in the production of what has without fail turned out to be equal to and invariably better than any other similar product throughout the World.

The Department of Commerce, through its Census of Manufactures, has produced some very interesting figures which constitute a valuable review of one aspect of the progress which the Aircraft Industry has made. The figures supplied by the Census of Manufactures are very detailed and, consequently, somewhat complicated and an endeavor has been made to simplify the statistics in the appended table which is more or less self-explanatory. The table relates only to those constituents of the Aircraft Industry which are primarily engaged in the construction of complete aircraft, excluding lighter-than-air, and aircraft parts other than engines or tires, except where such were made as subsidiary products by manufacturers of aircraft. It has not been found feasible to obtain statistics of aircraft engine manufactures since the Department of Commerce classifies such under "Engines and Water Wheels" including the automobile engine builders. The statistics for 1919 and 1914 are not strictly comparable with those for 1925, 1923 and 1921, ror the reason that establishments engaged primarily in the manufacture of aircraft parts, other than engines and tires, have been classified in the Aircraft Industry in the last three censuses, whereas at preceding censuses only manufacturers of complete aircraft were so classified. The great increase from 1914 to 1919 and the pronounced decrease from 1919 to 1921 were due almost entirely to the fact that the production in 1919 included the completion of contracts for the construction of aircraft intended for use in the War, and was, therefore, abnormal.

Itemized Progress

Some explanation of the table is necessary. Certain adjustments have been made in the tabulation of some of the figures in order to avoid (in some measure) disclosing the operations of individual establishments. For example, for the year 1919, the value of the products turned out by the two companies classified under column A, has not been individually stated but has, as indicated, been included in the figure of value of products of companies classified under column B. A similar procedure has been carried out in several other cases where the number of companies in a certain class is small, but each case is adequately indicated.

Perhaps the most interesting column is that which shows the grand total value of products by years. Here is clearly shown the inevitable deflation period from 1919 to 1921. and

	No. of Cos.	*A. No. of Cos. with prod-ucts less $5000*	*$ Total Value of prod-ucts for A.*	*B. No. of Cos. with products $5000-$ 20,000*	*$ Total Value of prod-ucts for B.*	*C. No. of Cos. with products $20,000-$100,000*	*$ Total Value of prod-ucts for C.*	*D. No. of Cos. with products $100,000-$500,000*	*$ Total Value of prod-ucts for D.*	*E. No. of Cos. with products $500,000-$1,000,000*	*$ Total Value of prod-ucts for E.*	*F No. of Cos. with products $1,000,000 & over*	*$ Total Value of prod-ucts for F.*	*$ Grand Total Value of products*	*No. of air-planes*	*$ Value of airplanes*	*No. of sea-planes*	*$ Value of seaplanes*	*No. Under Constr. at close of year*	*$ Value Under constr. at close of year*
1914	16	–	—	–	—	–	—	–	—	–	—	–	—	789,872	—	—	—	—	—	—	—
1919	31	2	in B	9	inc. A 146,000	5	281,000	8	1,766,000	2	in F	5	inc. E. 12,180,000	14,373,000	432	3,466,452	230	4,580,016	341	1,658,670
1921	25	4	10,993	6	59,208	4	217,842	4	610,278	6	in F. 5,754,660	1	in E.	6,652,981	290	3,818,340	12	314,768	374	966,322
1923	33	–	—	3	27,794	13	600,588	9	2,410,758	3	1,964,056	5	7,942,067	12,945,263	505	6,166,218	82	1,570,851	281	1,330,737
1925	39	–	—	–	—	–	—	–	—	–	—	–	—	12,277,000	621*	5,775,000	78	765,000	207	1,426,000

*Includes 61 rebuilt and reassembled airplanes, 68 convertible airplanes and seaplanes, and 73 airplanes, seaplanes, and flying boats not reported separately.

the steady and satisfactory growth from 1921 to 1923. The total value of products for 1923 was nearly double that reported for 1921 and was only 10% less than the somewhat abnormal 1919 total. It will here be noted that there is a slight decrease in the total value of products from 1923 to 1925. It will be seen, however, that the number of airplanes built during 1925 is greater than the number during 1923 so that the decrease in the total value indicates that the cost of the individual units has been reduced. From the standpoint of the purchaser this is a favorable sign. A very careful investigation of this condition has revealed that it is also favorable from the standpoint of the manufacturer. The complete census includes figures indicating the value of raw materials by years and it is noted that from 1923 to 1925 there is a reduction in this value of over $1,000,000. Furthermore, the Census also provides figures indicating the total value added by the manufacturers, which figure in each case, of course, includes the cost of manufacture and the profit, and it is interesting to note that from 1923 to 1925 this figure has increased a few hundred thousand dollars. So that, to sum the condition up, it would seem that the reduction in the cost of raw materials has enabled more products to be sold to the purchaser at a lower cost in spite of a slight increased cost of production, and thus a favorable aspect is placed upon the entire condition.

Of the 39 establishments reporting to the Department of Commerce for 1925, 14 are located in New York, 5 in Ohio, 3 in California, 2 each in Illinois, Kansas, Michigan, New Jersey, and Pennsylvania, and the remained in seven other states.

Advance Aircraft Co.

The Advance Aircraft Co., of Troy, O., which has been extremely active for several years, under the direction of C. J. Bruckner and E. Junkin, has recently enlarged its manufacturing plant to enable greater facilities for the manufacture of the Waco type of commercial plane. The Advance Aircraft Company has the largest production of commercial airplanes in the country, the production of the Waco 9, Curtiss OX5 three-seater plane, being on what might be termed a mass basis. It is interesting to recall that the Advance Aircraft Company was the first aircraft company in the commercial field to reduce the price of their product as a direct result of production.

The Waco 9 plane is employed very extensively throughout the country both in aerial service operations and in private use.

Aerial Service Corp.

Incorporated in May, 1920, and reorganized in January, 1925, the Aerial Service Corporation, under the direction of Henry Kleckler, president; W. C. Chadeayne, vice-president; H. Y. Rose, secretary and treasurer; J. F. Meade, general manager; and Harvey C. Mummert, chief engineer, is one of those particularly interesting organizations in the Aircraft Industry which have grown up since the War on the basis of purely commercial aeronautics and it has developed airplane designs which show the company to be a genuine upholder of the reputations of the Industry.

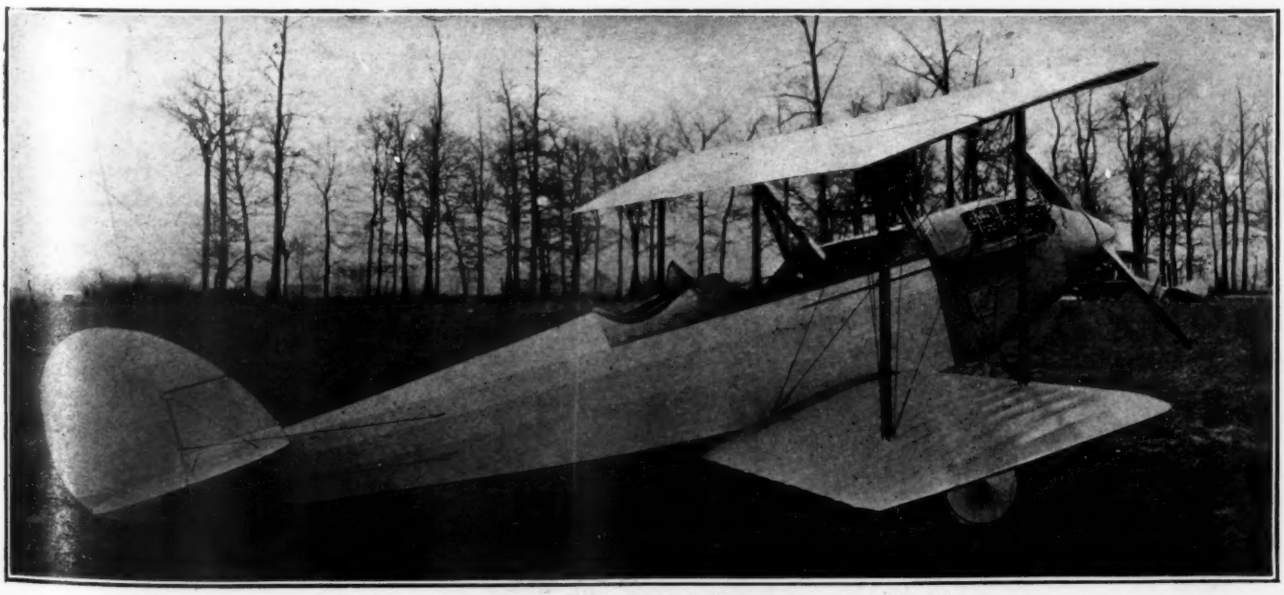
To the great credit of the company, especially as it was so soon after its reorganization, the Aerial Service Corporation produced one of the most successful air mail planes called for by the Post Office Department early in 1925. This plane, the Aerial Mercury, carries 1000 lb. of mail and, with the Liberty engine, has a very excellent performance. Later in the year, the Aerial Service Corporation produced the feeder-line air mail plane, the Mercury, Jr., fitted with the Curtiss C-6A engine. This plane appeared in the Airplane Reliability Tour last year, and completed the whole tour satisfactorily.

The Aerial Service Corporation is well equipped for production work with a factory space of 15,800 sq. ft. and, while it now employs 50 hands, it has in the past employed as many as 150 and is, therefore, amply suited to rapid expansion as soon as the coming aviation boom is here.

Aircraft Development Corp.

With lighter-than-air development in the United States is always associated the name of Upson and with this, the Aircraft Development Corporation, of Detroit, Mich., which was organized in September, 1921, and incorporated in June, 1922. The primary object of the company has been to develop the metal-clad airship upon which Ralph Upson has been working for so many years. Under the direction of Harold Emmons, president; C. S. Mott, vice-president; W. B. Mayo, vice-president; Arthur H. Schwartz, treasurer; Carl B. Fritsche, manager; and Ralph Upson, chief engineer, the company has already been considerably active in lighter-than-air development although it has not yet completed the construction of the metal-clad airship.

The company employs 20 and has a factory floor space of 8,000 sq. ft. available, although this is shortly to be increased to 20,000 sq. ft. A great deal has already been published on the development of the metal-clad airship and there is not



The Waco 9 commercial plane (Curtiss OX-5)

space to repeat this here, but the development is one of the most interesting in the field of aeronautical engineering research and the Aircraft Development Corporation is now working on the construction of the first airship of this type, a 200,000 cu. ft. experimental ship for the Navy.

The Aircraft Development Corporation was responsible for the design and construction of the Ford airship mooring tower at Dearborn, Ill., which was completed in 1925 and which is probably the most up-to-date airship tower in the World. It is interesting to note that the company is now engaged in erecting another tower of its own design for the Army at Scott Field, Ill. This tower is to be 175 ft. high. Furthermore, in addition to the work on the metal-clad airship, the Aircraft Development Corporation is preparing designs for a new experimental observation balloon for the Army Air Service,—on the whole, really a tremendous amount of lighter-than-air activity.

Airships Incorporated

One of the closest cooperators with the Army and Navy in their respective lighter-than-air programs is the firm of Airships Incorporated, of Hammondsport, N.Y., founded in May, 1920, under the direction of J. Lansing Callan, president; Beckwith Havens, vice-president and treasurer; and J. F. Boyle, secretary. In its factory of approximately 25,000 sq. ft. floor space, the company, which employs 40 skilled hands, is very active in the development of flotation gear for both military and commercial airplanes, in addition to its other activities in both lighter, and heavier-than-air work. It will be remembered that the chief productions of Airships Incorporated, have been TC airships, the MB and the TE airships, all non-rigids for military use, in addition to nets and other accessories for the Shenandoah and Los Angeles, and also a number of free balloons. The company also produces Canvas hangars, airplane safety belts, etc.

Among its most interesting products is the "Airaft", a collapsible boat of rubberized fabric. The uses of such a product are so innumerable, whether in aeronautical work or for pleasure, that a wide field for its manufacture is bound to develop.

Alexander Aircraft Co.

The Alexander Industries of Denver, Col., in August, 1925, formed the subsidiary, the Alexander Aircraft Company under the direction of J. Don Alexander, president; D. M. Alexander, vice-president and production manager; R. A. Duncan, secretary-treasurer; and J. A. McInaney, sales manager. The company has a large flying field at Englewood, Col., called the Alexander Airport and operates a factory of approximately 15,000 sq. ft. floor space, with 48 employees. To date, the output of the company has been 14 Alexander Eaglerock planes, a three-seater plane designed around the Curtiss OX-5 engine. The production schedule at the moment is at the rate of one plane per week. In addition, one experimental Eaglerock with a Super-Rhone engine has been produced.

The Eaglerock is an excellent three-seater touring plane with a good performance. An example of its suitability for general touring work is shown by the recent flight by Paul C. Vernier with a stock model, when he attained an altitude of 17,600 ft. with the OX-5 engine and a full load of gasoline, which is sufficient for 5 hours flight.

Atlantic Aircraft Corp.

In December, 1923, the Atlantic Aircraft Corporation of Hasbrouck Heights, N.J., was formed with the following officers: A. H. G. Fokker, vice-president; H. E. Payne, vice-president; S. C. Stivers, secretary; and R. B. C. Noorduyn, treasurer. The activities of the company are mainly centered around the development and maintenance of airplanes to Fokker designs and in this connection the recent Polar flight of Commander Byrd with the three-engine Fokker F-7 monoplane is a most notable achievement. This type of plane is fitted with three Wright Whirlwind radial air-cooled engines of 200 hp.

The company, in its New Jersey factory which covers about 50,000 sq. ft., is now developing a 40 passenger four-engine airliner and is also working on several military projects.

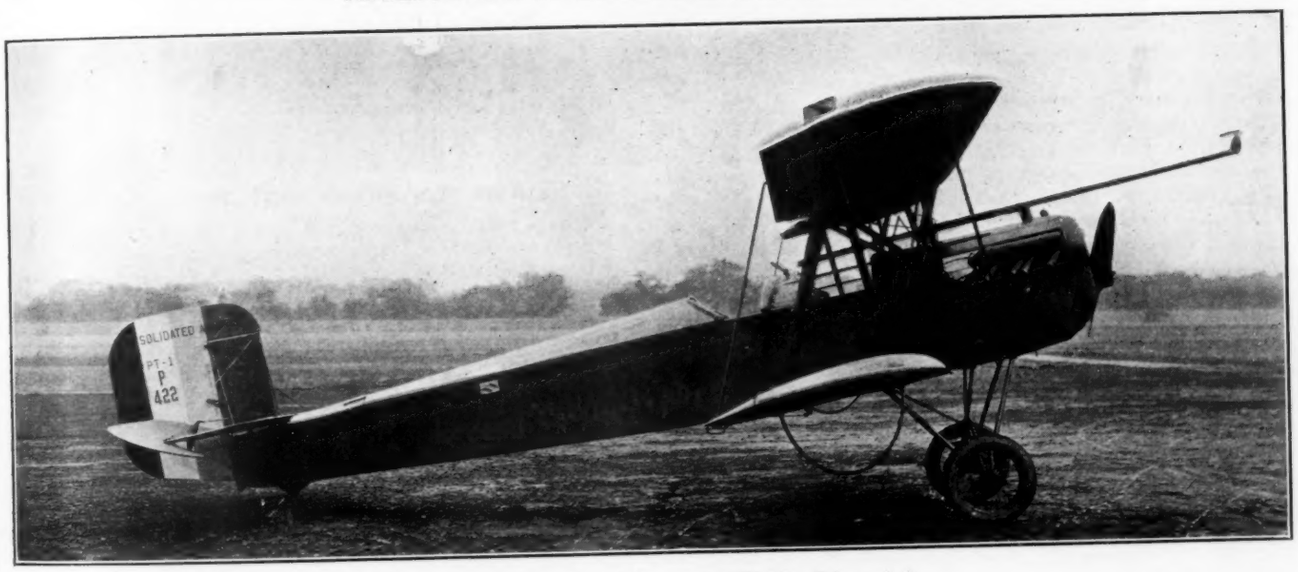
Boeing Airplane Company

The Pacific Aero Products Company, formed in July, 1916, in Seattle, Wash., was primarily organized to undertake the development of some very interesting designs of seaplanes which had been produced by W. E. Boeing and a small group of his associates. In April, 1917, the company was changed to the Boeing Airplane Company and development was rapidly carried on in the production of a pontoon training plane powered with the Hall-Scott A-7a, 100 hp. engine. One of these was purchased by the Navy and soon after tests an order for 50 similar planes was placed, for use at the San Diego Naval Air Station.

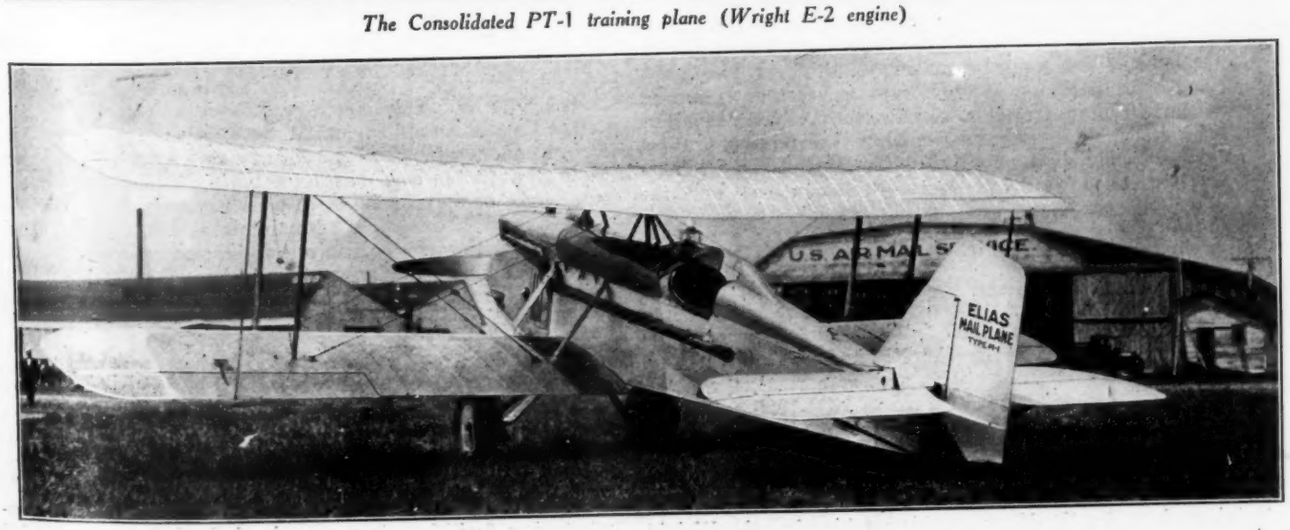
Thus started what has developed into one of the most important factors in the Aircraft Industry today. Recent products of the Boeing Airplane Company are well-known. Among these may be mentioned the Boeing Pursuit of 1924 and the Boeing Navy Patrol plane PB-1, the large twin engine flying boat equipped with twin Packard 500 hp. engines mounted in tandem.

The U.S. Army non-rigid airship TC-5 built by Airships Incorporated

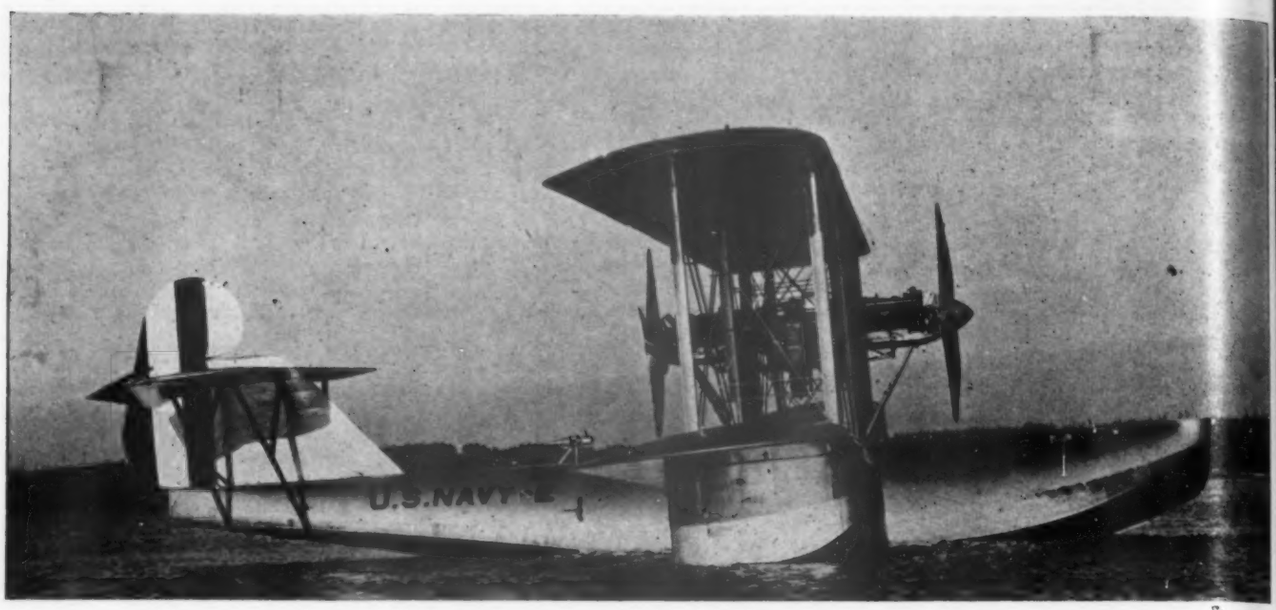
The Buhl-Verville Airster three-seater plane (Wright Whirlwind)



The Consolidated PT-1 training plane (Wright E-2 engine)



The Elias mail plane, M-1 (Liberty engine)



Boeing P. B. 1 seaplane (twin Packard 1A-1500, 500 hp. engines)

Buhl-Verville Aircraft Co.

A recent comer into the American Aircraft Industry is the Buhl-Verville Aircraft Company, which was organized in March, 1925, with Lawrence C. Buhl, president; Alfred V. Verville, vice-president; and H. P. Smith, secretary and general manager. The company, however, in spite of its comparatively recent formation, has already produced one of the best commercial planes in use at this time. It must be remembered, of course, that the name of Verville has been known in the aeronautical field for many years.

The Buhl-Verville Company, which occupies a factory of 7000 sq. ft. manufacturing floor space and employs at the present time 25 men, has, to date, produced two experimental planes and three production machines. The Buhl-Verville Airster three-seater, which was originally equipped with the OX-5 engine and since fitted with the Wright Whirlwind engine, has already done a great deal of flying and the company is producing both types in order to cover the range of commercial operations. The machine is very adaptable for both passenger carrying and feeder-line mail carrying and is bound to find an important place in future commercial operations.

Consolidated Aircraft Corp.

The Consolidated Aircraft Corporation of Buffalo, N.Y., was incorporated in May, 1923, with the following officers: R. H. Fleet, president and general manager; V. E. Clark, vice-president and chief engineer; George Newman, factory manager; and Thomas Kenny, secretary and treasurer. The company came by its name because, immediately upon incorporation, it absorbed the aviation activities of the Dayton-Wright Company (Division of General Motors Corporation) and the Gallaudet Company.

During the first year of activities the Consolidated Aircraft Company built twenty side-by-side training machines for the Army Air Service. During the Spring of 1924, an experimental training airplane was designed, built and entered into open competition before an official board of officers of the Army training station at Brooks Field, San Antonio, Tex. The company won the competition and, as a result the Army Air Service has, during the fiscal years 1924-1925 and 1925-1926 ordered 150 Consolidated PT-1 airplanes.

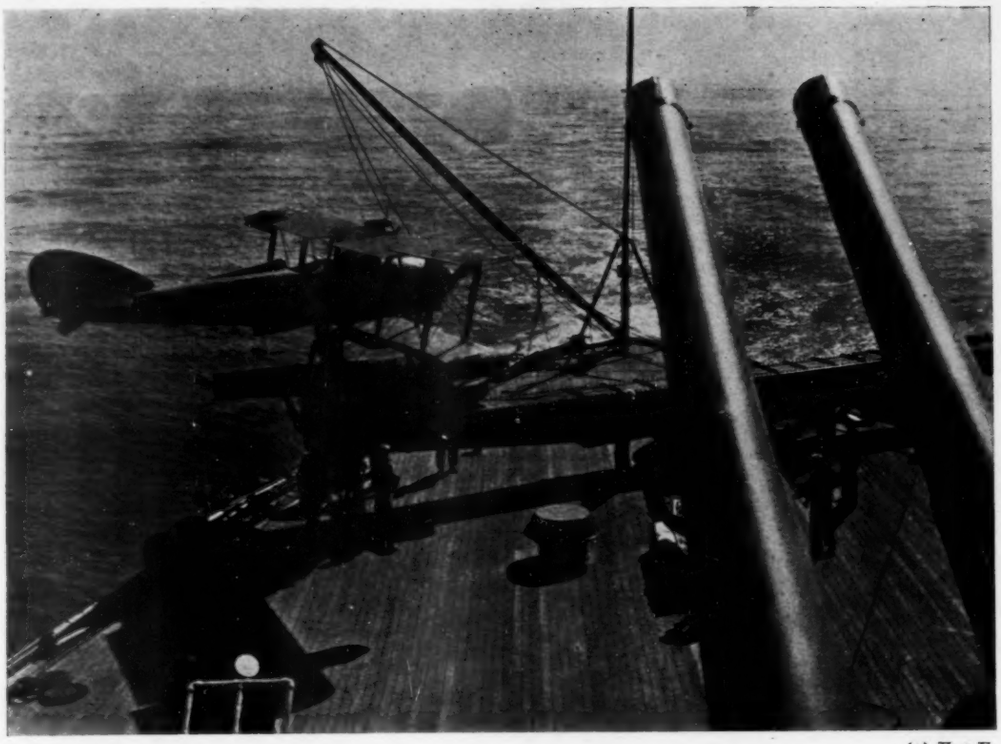
Again, during the Fall of 1925, the Consolidated Aircraft Company designed, built and entered into open competition at the Naval Air Station, Anacostia, D.C., an experimental training plane for the Navy. This machine has the Wright Whirlwind engine and is convertible from a land type to a seaplane type. It is also convertible from a flight training type to a gunnery training type. The company won the competition and, as a result, orders have been received during the year 1925-1926 for 66 Consolidated NY-1 machines. The company has, altogether produced and delivered to date, 170 planes, and employs about 259 workers.

Curtiss Aeroplane and Motor Co., Inc.

The Curtiss Aeroplane and Motor Co., Inc., is one of the oldest and best known aircraft organizations in the United States, and incidentally, in the World. Certainly the Curtiss Company is as old as the American Aircraft Industry for it has been in continuous operation manufacturing aircraft and aircraft engines for more than sixteen years, during which time it has built up a nation-wide reputation for first class design and manufacture.

The original Curtiss Company was organized in 1910. At the present time two establishments are maintained, the executive offices and experimental factory being located at Garden City, L. I., N. Y. while the production airplane and engine factory is at Buffalo, N. Y. Furthermore, the company maintains a first-class flying field, Curtiss Field, Mineola, L. I., N. Y. and many other allied fields throughout the entire country. The present officers are: C. M. Keys, president; F. H. Russell, vice-president; Leonard Kennedy, vice-president; C. Roy Keys, vice-president; J. A. B. Smith, secretary and treasurer; T. P. Wright, Chief engineer, airplane division; and Arthur Nutt, chief engineer, Engine division.

The Curtiss Aeroplane and Motor Company has always been a forerunner in the development of new and original airplane designs a fact which has been made possible largely as a result of, not only its inherent wide resources, but because of the adherence to a policy of maintaining the highest possible technical engineering organization in close cooperation with its manufacturing and operating bodies. It was because of this that the Curtiss Company was able to play so important a part in the remarkable showing which the American Aircraft Industry put up during the War when called upon to fulfill a tremendous production order in so short a space of time. During the War the organization included about 14,000 employees, while even at the present time this figure is as high as 600, for the company has important Government contracts in hand in addition to a certain amount of commercial production and engineering development work which is continually going on in the company's seven foot wind tunnel. The manufacturing facilities alone may be judged from the 300,000 sq. ft. of factory floor space. It is interesting here to recall



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Catapulting a Vought UO-1 from U. S. S West Virginia

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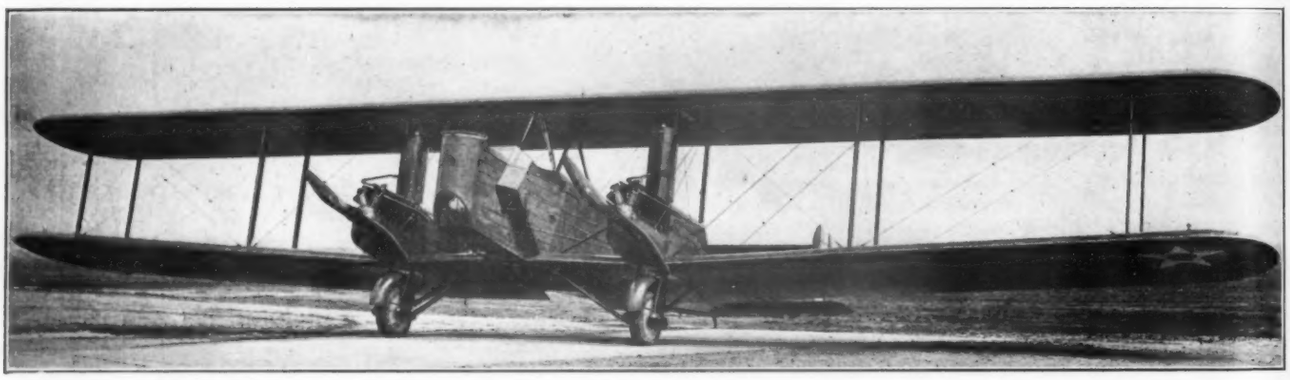
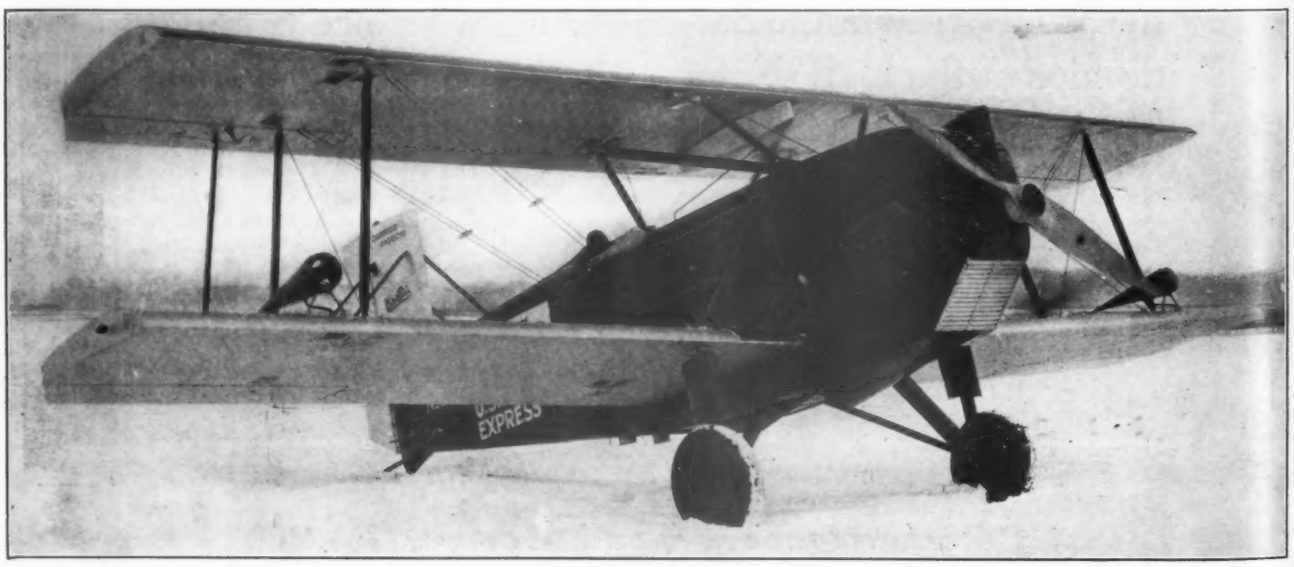
"Performance beyond Comparison"

The Curtiss Falcon O-1 observation plane (Curtiss D-12)



The Curtiss Condor, NBS-4 bombing plane (two Liberty engines)



The Curtiss Carrier Pigeon mail plane (Liberty)

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that to date the company has produced no less than, at a rough estimate, 6,000 airplanes and 6,000 aircraft engines.

It would be impossible, within the small space available, to recount all the original types of planes which the Curtiss Company has produced since its organization but most of these are well-known to all engaged in the aeronautical field. It may be mentioned, however, that no less than 60 different types have been produced since 1916, and in addition to these there have been many modifications to individual types which do not number in this figure at all. During 1925, the R3C racers were produced, which it will be remembered, won the Pulitzer and Schneider cup races at an average speed of 248.99 m.p.h. (200 km. course) in the former case and 232.57 m.p.h. in the latter, in each case breaking the World closed circuit speed record. The R3C-2, the seaplane racer, also set up the new World straight-away seaplane speed record at 245.71 m.p.h. In addition, during 1925, were produced the Hawk pursuit planes, P-1 and P-1A and F6C-1 and 2, and the Falcon O-1 observation plane, the original design of which won the Army Observation plane competition of 1924, the AT-4 pursuit training plane, the Carrier Pigeon mail plane and the Lark general purpose commercial plane.

In engine development and manufacture the Curtiss Company is also a leader, having produced no less than 11 different and successful types during the period 1916-1926, of which the OX-5, a 1916 design is still the most common commercial engine in use in the country, and of which the D-12, for example is acknowledged both here and abroad as one of the finest high power engines in existence. Again, mention should be made of the Curtiss-reed duralumin propeller which is in such wide use and which was awarded the Collier Trophy in 1925. It is understood that new designs of both water-cooled and air-cooled engines are in process of development, under contract and actually in construction so that there is every indication of an almost unequalled past holding out a similar future.

Detroit Aircraft Engine Works (Syn).

The Detroit Aircraft Engine Works (Syn) is an organization of recent formation created for the purpose of developing and placing upon the market an air-cooled engine of low horse power suitable for commercial machines. The organization is operating under the syndicate managership of Capt. E. V. Rickenbacker with Glenn D. Angle, chief engineer, and it has produced a very interesting five cylinder engine of 65 hp. Two experimental engines have already been produced and ten production engines. The engine has passed its tests very well and represents a most serviceable commercial power plant.

Eberhart Aeroplane & Motor Co., Inc.

The Eberhart Aeroplane and Motor Co., Inc., of Buffalo, N.Y., formerly known as the Eberhart Steel Products Co., Inc., was formed in 1918. The officers of the company are: Cleburne Eberhart, Jr., president; William Middleton, secretary and treasurer; Frank W. Duffort, sales manager; Fredric Flader, chief engineer; Thomas F. Morrissey, project engineer; Norman MacQueen, chief designer; and Samuel J. Irvine, factory superintendent. The factory, which covers an area of 103,000 sq. ft., has employed 350 people but the plant is equipped for 500 employees.

To date, this firm has manufactured 77 airplanes, three of an experimental type and the remainder in production. At the present time, it is concentrating on the design of a new type pursuit training plane. The company has also carried on considerable experimental work for the Air Service. It has built hundreds of bomb racks, bomb sights, super-chargers, camera mounts, machine gun synchronizers, etc.

A development of the Eberhart Company that is of major importance is the new type parachute flare, which has very great candle power and brilliancy. With the continual increase in night flying, the new Eberhart Airways Flare will be even more extensively used.

G. Elias & Bro., Inc.

The company of G. Elias and Bro., Inc., of Buffalo, N.Y., though formed as long ago as 1881, has, since the War, undertaken the construction of airplanes under G. Elias, president. While the company, which devotes as much as 30,000 sq. ft. of its factory floor space to aircraft construction, only employs 40 hands in the aircraft department at the present time, it has produced no less than 15 experimental planes to date, including the M-1 mail plane designed to Post Office specifications, around the Liberty engine. It is particularly interesting to note that Elias and Bro., Inc., have in process of development a commercial plane to fill the needs of light freight carrying by air, a type which will be watched for with great interest.

Goodyear Tire and Rubber Co.

The Goodyear Tire and Rubber Company has always been an important factor in the aeronautical field. In the years before the War, the company was active in the production of spherical balloons and a close contact and activity has been maintained in the lighter-than-air field ever since. Under the direction of W. C. Young, who is in charge of aeronautical work, the company has produced many non-rigids for the Air Corps. It must also be recalled that the Goodyear Company has the American rights on the Zeppelin patents and, with the cooperation of Dr. Arnstein, formerly of the Zeppelin Company, the Goodyear Company has already developed the designs for very large rigid airships which will probably materialize in the not very distant future.

The Mercury Jr. feeder-line mail plane of the Aerial Service Corp. (Curtiss C-6A, 160 hp.)

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Buffalo, New York

The Huff Daland Fighter AT-2 (Wright)

Huff Daland training plane, AT-1 (Wright E-2, 180 hp.)

The Loening Amphibian (Packard 2A-1500 inverted 500 hp. engine)

THE LOENING AMPHIBIAN

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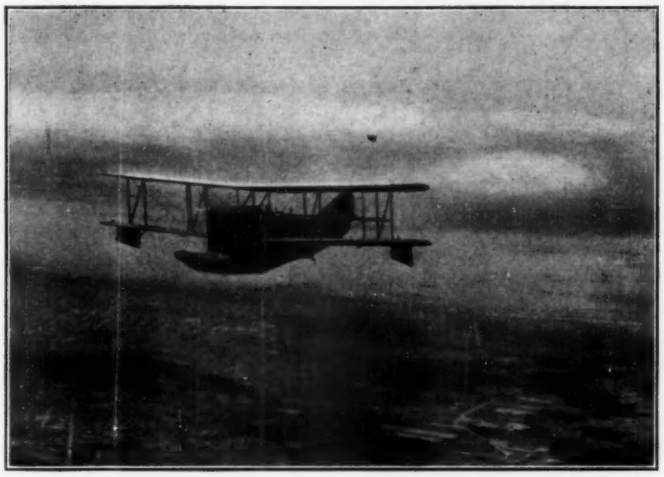

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Charles Ward Hall, Inc.

In the design and construction of all-metal airplanes, the firm of Charles Ward Hall, Inc., is a leader in the American Aircraft Industry. Mr. Hall himself has devoted all his time for a number of years to the problems of metal construction of airplanes and, as a result, he has developed principles which have enabled the application of metal in the field of airplane manufacture to a degree which has spelled much success. Charles Ward Hall, Inc., has manufactured a number of all-metal airplanes including original design for the Navy Department and has also been responsible for the conversion of some designs to incorporate metal construction, notable the Navy F4C-1 single-seater. A very interesting little all-metal sport flying boat has also been produced by the Hall Company.

Hess Aircraft Co.

The Hess Aircraft Company, of Detroit, Mich., was organized comparatively recently under the direction of Audrey W. Hess, president; A. T. Hess, vice-president; L. E. Joslyn, secretary; and C. H. Mooney, treasurer. The company is very busy in development work, being engaged in the production of a small plane suitable for feeder-line mail work.

Huff Daland Airplanes, Inc.

In June, 1920, the firm of Huff, Daland and Company was organized and its name was changed within recent months to Huff Daland Airplanes, Inc., with Thomas H. Huff, president; Elliott Daland, vice-president; and Sidney Newborg, treasurer. The company's plant at Bristol, Pa., is large, offering a clear manufacturing floor 1000 ft. long with an area of no less than 140 sq. ft. and the company is employing 300 hands, the maximum it has employed at any time. In all, Huff Daland Airplanes, Inc., have produced 80 planes of ten distinct types. One of the earliest and most interesting of these, was the Petrel commercial plane with the Curtiss OX-5 engine. This plane is of exceptional interest because of the activities of the Huff Daland Dusters, Inc., a subsidiary company of Huff Daland Airplanes, Inc. This former company is employing the Petrel for its cotton dusting activities in the Southern States. Fifteen Petrel cotton dusting planes are operating this year and will cover over 100,000 acre applications. These planes are powered with Wright Whirlwind engines and carry 800 lb. of calcium arsenate. The large cotton dusting plane, the Petrel model 31, has a Liberty engine and carries 1800 lb. of chemical.

The latest production plane of Huff Daland Airplanes, Inc., is the Pegasus, the Army Air Service XLB light bomber. This is the plane which won the Air Transport Trophy at the 1925 National Air Races with an average speed of 128 m.p.h., and attained a speed of 130 m.p.h. The plane is fitted with the Packard 2500, 800 hp. engine.

The company is now engaged in the development of the Cyclops, the large single engine bombing plane for the Army Air Service.

Johnson Airplane and Supply Co., Inc.

Formed in September, 1920, with E. A. Johnson, president; R. T. Herr, secretary; and D. L. Dwyer, treasurer, the Johnson Airplane and Supply Co., Inc., of Dayton, O., has been one of the most active of the post-war comers into the American Aircraft Industry and has been carrying on extensive aerial service work and airplane maintenance in addition to developing some very interesting experimental airplanes. The company maintains a complete modern airdrome of 80 acres with all facilities and employs at the moment 20, while as many as 50 have been employed by the company at times, in its factory which covers approximately 40,000 sq. ft. and is, therefore, capable of extensive output when the demand arises.

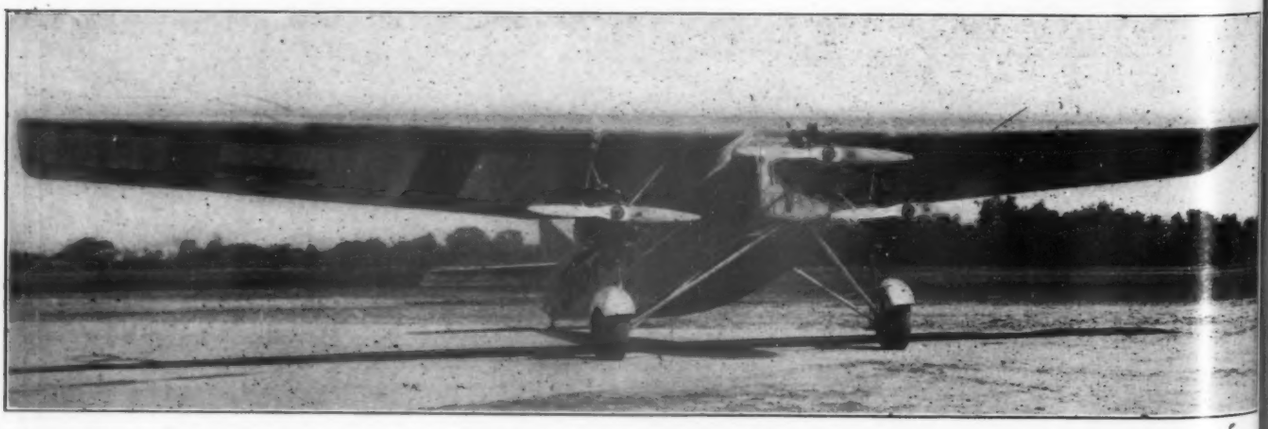
One of the most interesting products of the Johnson Airplane and Supply Company, Inc., is the Driggs-Johnson monoplane which performed so well in both the 1924 and the 1925 National Air Races. It may here be noted also that of the Bumblebee and the Canary, two other experimental products which the company has produced, the former won first place in one of the commercial speed events in the 1924 National Air Races.

E. M. Laird Airplane Co.

E. M. Laird has been one of the foremost manufacturers solely of commercial aircraft since he first commenced operations during the War. When he was located in Wichita, Kansas, E. M. Laird produced the Laird Swallow which was one of the most successful light commercial planes of its time. Since then, however, when the E. M. Laird Airplane Company formed in Chicago, Ill., the company has produced several other highly successful commercial airplanes around the Curtiss OX-5 engine. Of these the Laird Commercial is the most recent. While the original of the Commercial Series was equipped with the OX-5 engine, the plane is now equipped with either the Curtiss C-6 or the Wright Whirlwind engine. It is with the Laird Commercial equipped with the Whirlwind engine that the service on the Chicago-Minneapolis St. Paul air mail route, contracted for by Charles Dickenson, is carried on.

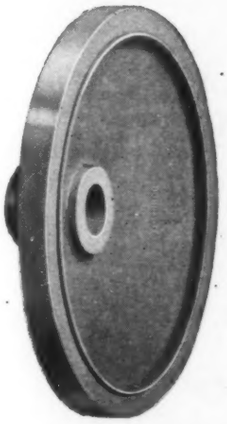
Lincoln Standard Aircraft Co.

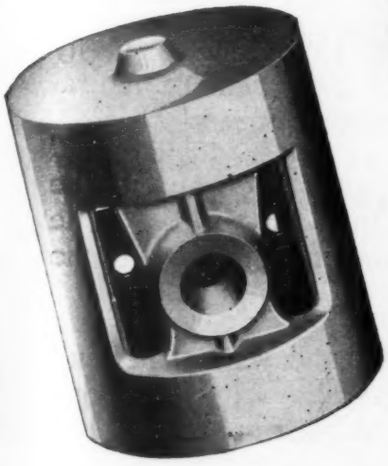
The Lincoln Standard Aircraft Company, formed since the War and originally the Nebraska Aircraft Company, has been very active in commercial aviation development in the West and Middle West. Under the direction of Ray Page, president of the company, several very interesting commercial planes have been produced, notably the Lincoln Standard Sport plane and the Lincoln Standard LS-5 four passenger and pilot plane which is now in extensive commercial use. Recent reports from the company indicate that the second shipment of planes to Nicaragua has just been completed and that locally there is a continual and constant demand for the LS-5.



The new Ford-Stout three-engine passenger plane, a development of the former Stout all-metal monoplane. The machine has three Wright Whirlwind 200 hp. air-cooled engines.

BOHNALITE PERMANENT MOLD CASTINGS





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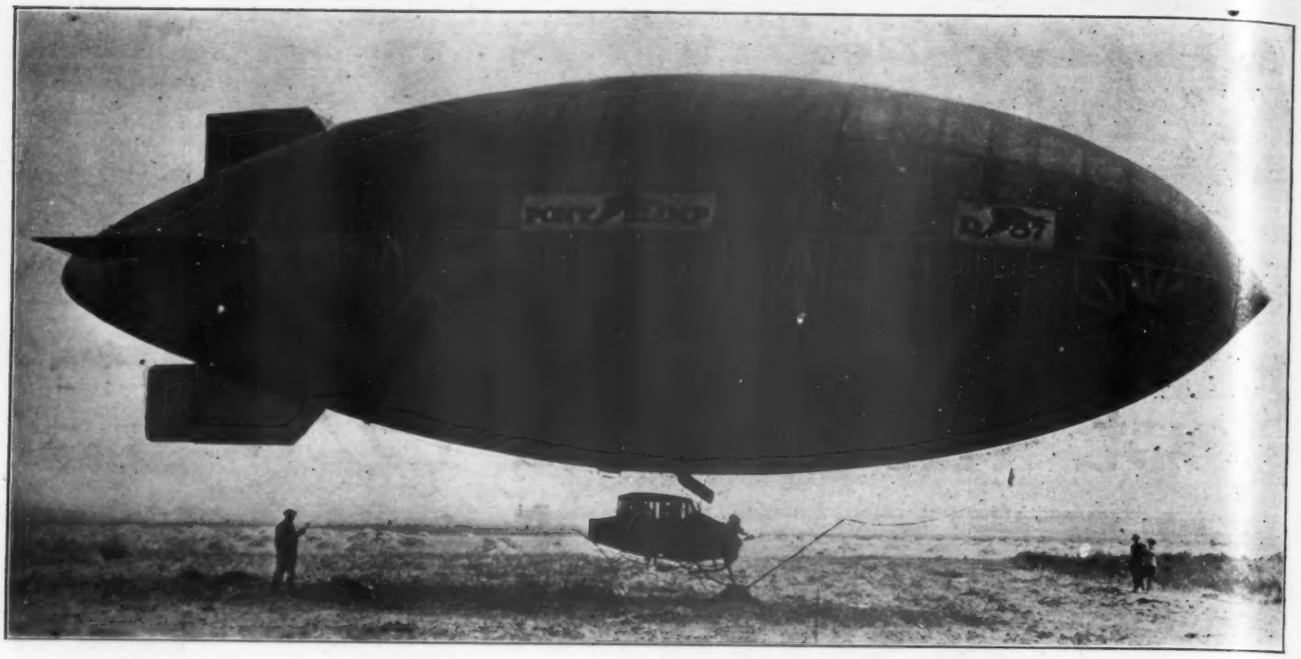
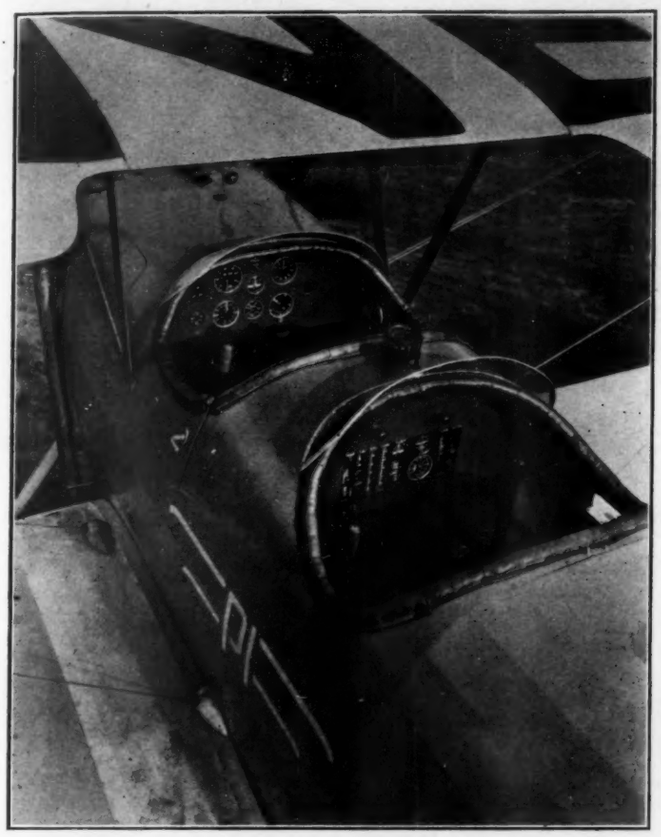


A typical Goodyear development. The Pony Blimp, though by no means their latest production, is characteristic of Goodyear workmanship.

The Laird Commercial (Wright Whirlwind)

The Johnson three-seater Canary (Curtiss OX-5)



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Back of rear cockpit: Generator of Earth Inductor Compass.
Right center section strut: Venturi tube which operates Turn Indicator and Flight Indicator.
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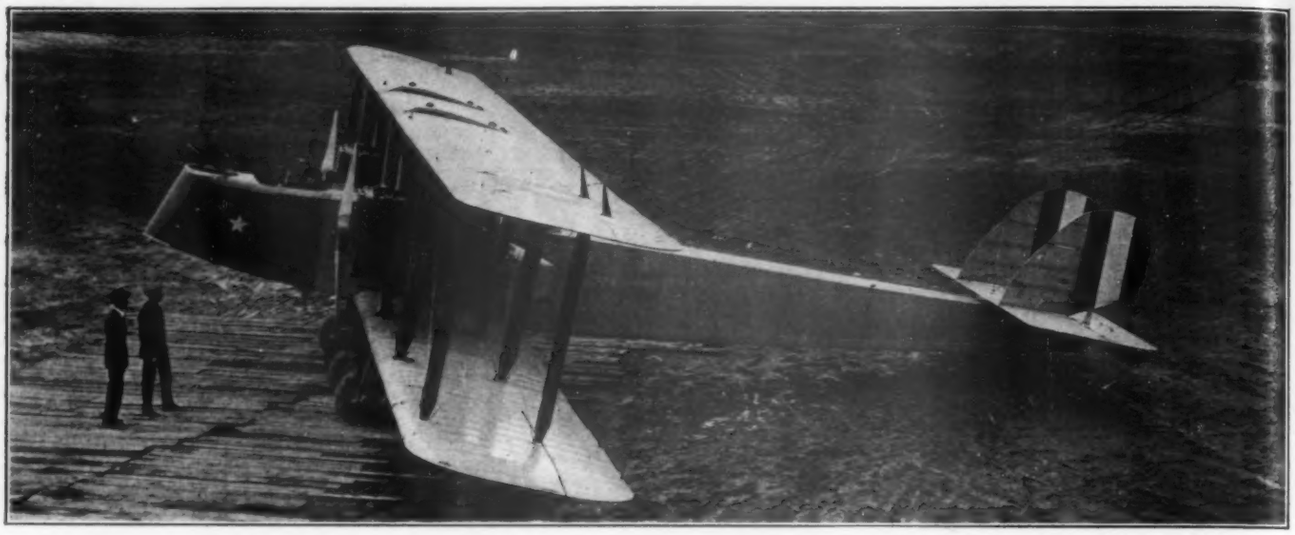


The Martin Bomber (two Liberty engines)

Glenn L. Martin Co.

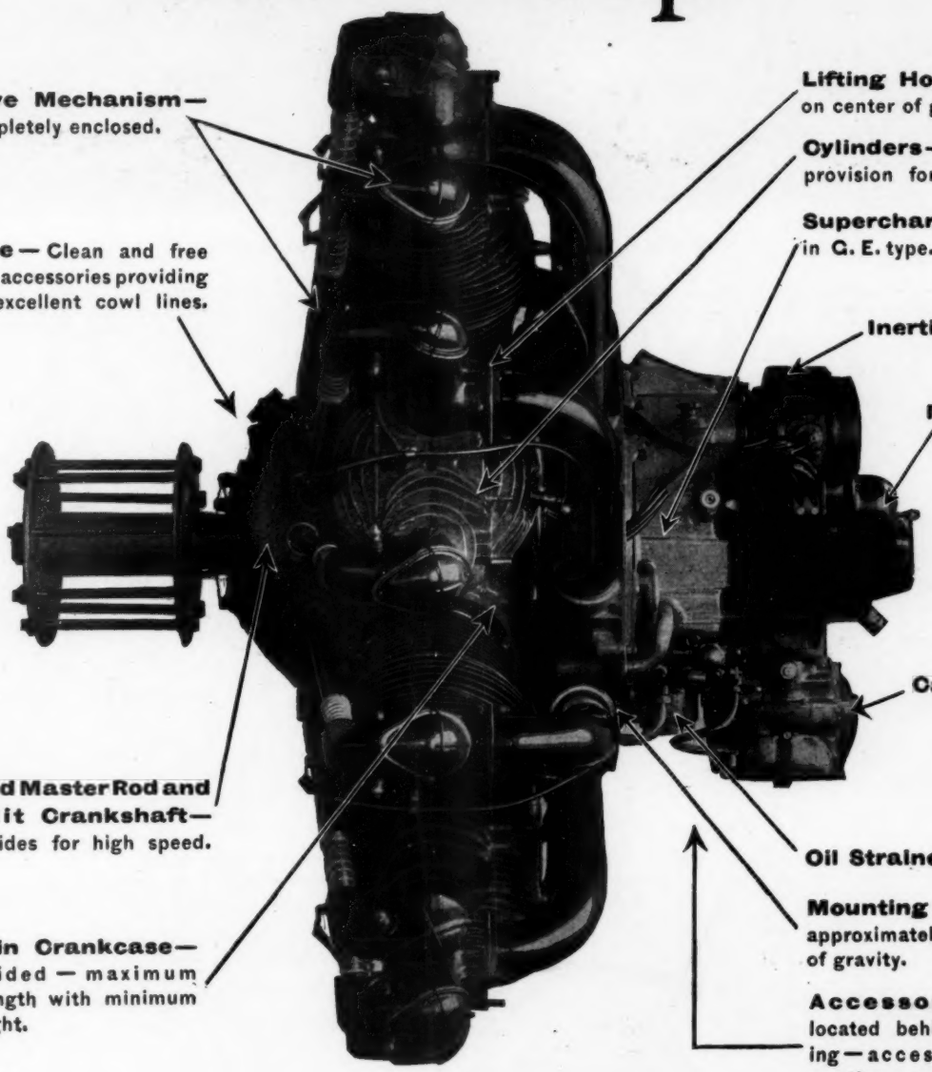
One of the oldest American pilots and aircraft producers, Glenn L. Martin, organized the Glenn L. Martin Company in the Autumn of 1917, although Mr. Martin and his associates had been engaged in the design and manufacture of aircraft for eight years prior to the entry of the United States into the War, during which time many successful airplanes had been produced, culminating in the Martin Bomber produced by the Glenn L. Martin Company in 1918. The first flight of the first bomber actually took place on Aug. 17 of that year. The advent of this machine set a landmark in American aircraft production for the Martin Bomber has remained one of the most successful twin-engine planes ever produced. In fact, the highest tribute which can be paid to this Liberty engined plane is the fact that its basic design remained almost unchanged in spite of the many uses to which the machine has been applied, for it will be recalled that the Martin Bomber has successfully served as a long-distance reconnaissance machine, a day bomber, a night bomber, a twelve-passenger army transport and as a mail and express machine.

Since the War, the Martin Company has enjoyed continued success and, in the factory, which covers 120,000 sq. ft. of manufacturing floor space, and employs 650 men in airplane construction, the company is very active in meeting its contracts. Since 1912, the Martin organization has produced no less than 500 airplanes. It will be recalled in 1924, the company delivered 40 monoplane observation machines to the Navy and last year 75 three-purpose planes also to the Navy, in addition to other orders, and a contract of 124 more planes is being dealt with.

Judging by the activity in hand and the fact that the Martin Company has never stood still, there is every indication of further interesting developments in the future. Last year the company produced and delivered no less than $2,000,000 worth of airplanes and during the first half of this year, there was no less than $3,000,000 worth of aircraft under delivery. Such a condition can only be regarded as indicative of further prosperity to come.

Another Martin product. The Glenn Martin Commercial plane (Wright E-4, 200 hp. engine).

Exclusive Reasons for Leadership



Valve Mechanism— Completely enclosed.

Nose — Clean and free from accessories providing for excellent cowl lines.

Solid Master Rod and Split Crankshaft— provides for high speed.

Main Crankcase— Divided — maximum strength with minimum weight.

Lifting Hooks— on center of gravity.

Cylinders — Unusual provision for cooling.

Supercharger — built in G. E. type.

Inertia Starter.

Magnetos.

Carburetor.

Oil Strainer.

Mounting Flange— approximately on center of gravity.

Accessories — all located behind mounting — accessible and weather proof.

The "Wasp"

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD CONNECTICUT

PRATT & WHITNEY U.S.A. DEPENDABLE ENGINES

LANDING FACILITIES MUNICIPAL FIELD AND CONNECTICUT RIVER ON AIRWAYS MAPS

The Lincoln LS-5 five-seater (Hispano-Suiza 180 hp. engine)

The Ryan M-1 monoplane with Super-Rhone 120 h.p. engine

The Ireland Meteor four-passenger plane (Curtiss OX-5)

RYAN M-1

$2890

OX-5 EQUIPPED

THE MOTOR MOUNT COMPLETE IS DETACHABLE BY FOUR BOLTS, ALLOWING A POWER PLANT RANGE OF FROM NINETY TO TWO HUNDRED HORSE POWER.

WE HAVEN'T FLOWN *ALL* OF THE AIRPLANES IN THE UNITED STATES, BUT WE ARE SINCERE IN OUR CONVICTION THAT THE *RYAN M-1, OX-5* EQUIPPED, HAS AN ALL AROUND PERFORMANCE *SUPERIOR* TO ANY STOCK MODEL *OX-5* JOB ON THE MARKET.

REACHING THE ZENITH OF PERFORMANCE WITH A WRIGHT WHIRLWIND.

RYAN AIRLINES, INC.

San Diego, California

Loening Aeronautical Eng. Corp.

The Loening Aeronautical Engineering Corporation, under the direction of Grover Loening, president; A. P. Loening, vice-president and treasurer; and Robert LeRoy, secretary, was organized in 1917 and has, since then, produced no less than 15 experimental types of airplanes and seaplanes which have met with considerable success, the name of Loening, however, has been associated with aviation from its very earliest days.

The designs produced by the Loening Aeronautical Engineering Corporation have always been peculiarly distinctive. Particular mention may be made of the Loening Air Yacht which has been in private use a great deal. It will be remembered that it was a Loening Air Yacht which made the flight from Palm Beach, Fla. to New York City, on April 17, 1922, leaving the former place at 7:00 a. m. and arriving in New York at 5:00 p. m.

However, undoubtedly the most notable production of the Loening Company is the Amphibian which was produced in 1924. The machine is particularly interesting in that it incorporates the inverted Liberty engine, a development for which the Loening Company is largely responsible. The machine has since been equipped with the Packard 1500 inverted engine and in this form the Amphibian is a three-seater, while with the Liberty engine it is a two-seater. It should be noted, however, that inasmuch as two seats are, in each case, provided for the observer, one in the bottom of the hull, in order that he may carry out photographic work, the machine should be designated a three-seater with Liberty or a four-seater with Packard engine.

It will be remembered that Loening Amphibians were used in the MacMillan Arctic expedition in 1924-25 with great success. Furthermore, it will be recalled that the Loening Amphibian holds four World seaplane records created in 1925.

As regards future development it is interesting to learn that the Loening Company, whose factory space now amounts to 40,000 sq. ft. is shortly to extend this to 60,000 sq. ft. and that they are at this moment working on a basis of production of 100 Amphibians per year, employing 85 hands which spells a very favorable outlook.

Packard Motor Car Co.

The Packard Motor Car Company, of Detroit, Mich., with a World reputation for the manufacture of high-class automobiles since 1904, turned its attention to the aircraft field during the War, and it is not at all surprising that the company has since been responsible for some of the very finest aircraft engines ever produced. Under the direction of Alvan Macauley, president and general manager, J. G. Vincent, vice-president in charge aeronautical engineering and a number of other notable engineers and executives, the company employs no less than 350 engaged in the manufacture of airplane engines, although during the War, the pressure on production was so great that as many as 12,000 were engaged.

The Packard Motor Car Company at the moment builds two aircraft engines, the Packard 2A 1500 and the Packard 2A 2500. Both engines are made in three different types, the direct drive, geared, and inverted, although of the inverted type only the 2A 1500 has been produced so far. The 2A 1500 is a twelve cylinder water-cooled engine of 500 hp., while the 2A 2500, also a twelve cylinder water-cooled engine, develops 800 hp. The company is engaged in large contracts on both types for the Army and Navy.

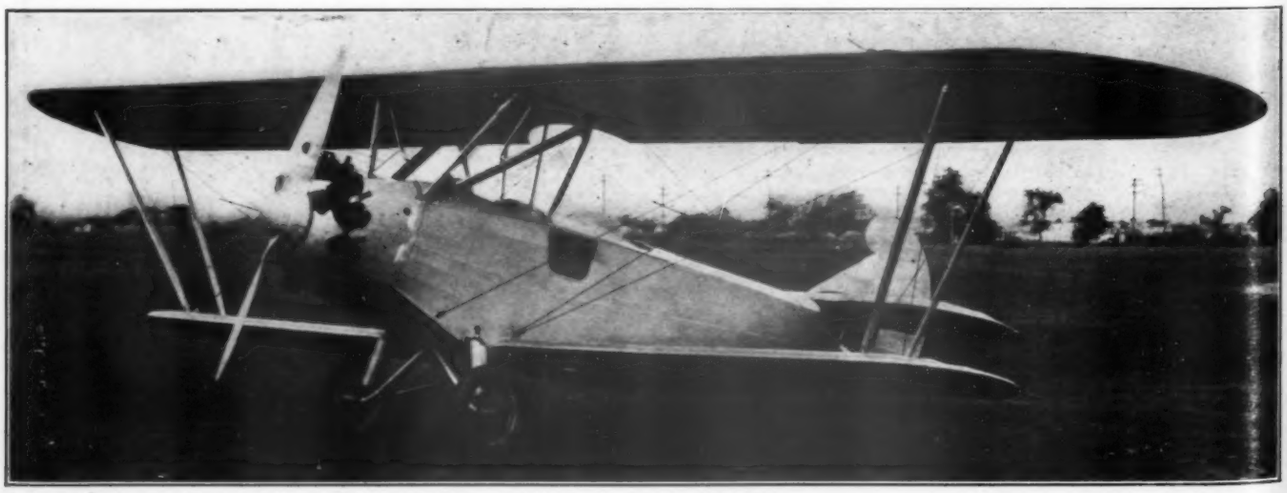
It will be remembered that the PN-9 flying boat with which Commander Rodgers traveled from San Francisco to Hawaiian waters last year was equipped with two of the 1A 1500 engines and the fact that the journey to the Islands was not completed by air was due to the insufficient supply of gasoline carried and not any trouble with the engines which performed perfectly throughout the flight and, incidentally, still performed satisfactory immediately refuelling was possible, in spite of the nine days exposure to the storms and sea-filled air of the Pacific ocean. It is interesting to note that the Navy has apparently almost standardized on the Packard engines for high powers in its large patrol type seaplanes.

The Packard Motor Company is continually developing new types and further interesting developments may be expected at any time.

Pratt & Whitney Aircraft Co.

The Pratt & Whitney Aircraft Co. of Hartford, Conn. is a comparatively new comer into the Aircraft Industry being organized on Aug. 2, 1925, although its officers, F. B. Rentschler, president; George J. Mead, vice-president; George S. Wheat, assistant to the president; and E. L. Morgan, secretary and treasurer, are well-known in the aeronautical field. The company is a subsidiary of the Pratt and Whitney Company which was established in 1860 and which, to date, has ranked as one of the most expert and substantial manufacturing organizations in the country, producing a great variety of precision tools and machinery. Thus, it may be seen that, apart from the ability of its organizers and executives, the Pratt and Whitney Aircraft Co. has a background of experience which is of the very greatest value and importance.

In spite of the comparatively short time during which the company has been in existence it is interesting to note that no less than six experimental engines have been built and the success of the Pratt and Whitney Wasp engines is now well-known. The total weight of this engine, which is an air-cooled radial, is 650 lb. with all accessories including the propeller hum, and the fact that it develops 425 hp. at 1900 r.p.m. is indicative of the very excellent design qualities which it incorporates, and how well these qualities have been carried out in construction is indicated by the excellent results recently obtained in the Navy's tests of this engine. Rumor has it that radial engines of even higher power are under development and with a factory floor space of 80,000 sq. ft. it is easy to



The Sikorsky S-31 (Wright Whirlwind)

Eberhart

BUFFALO

Manufacturers of Airplanes and Airplane Parts

Contractors to U. S. Army & Navy

We are equipped to manufacture and make prompt delivery of airplanes and their accessories and have on hand all tools and fixtures to produce the following parts and assemblies to Air Service Specifications:

Bolts, Nuts and Clevis Pins of all sizes.
All items and parts connected with airplane armament.
Release and attaching mechanism for landing flares.
Night flying equipment complete.
Ignition shielding equipment.
Wood and metal bracing struts.
Motor parts and accessories.
Gas and oil tanks of all descriptions.
Cowling.

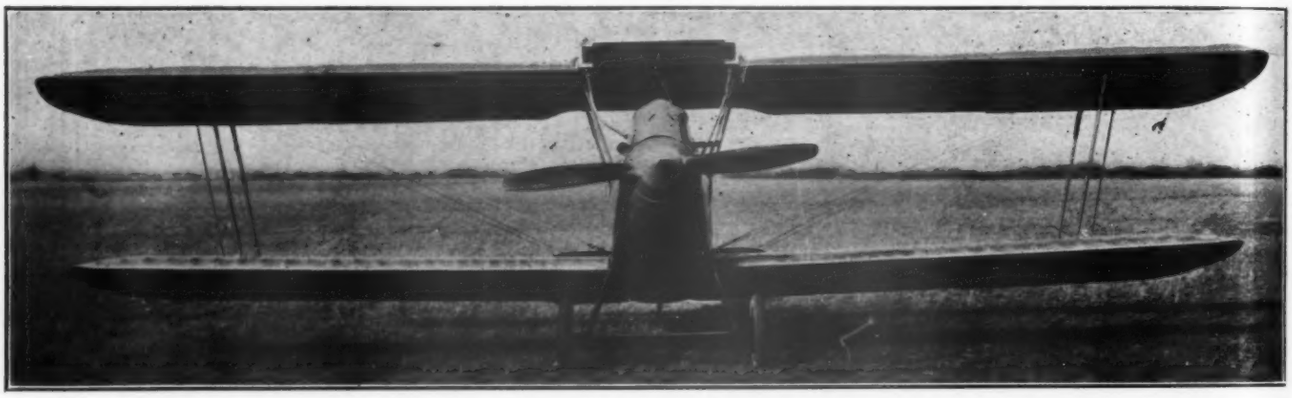
Our new Airways Flare, which has already done much to insure the safety of the night flyer and his cargo, can be safely and speedily attached to any type of airplane.

LET US QUOTE ON YOUR REQUIREMENTS

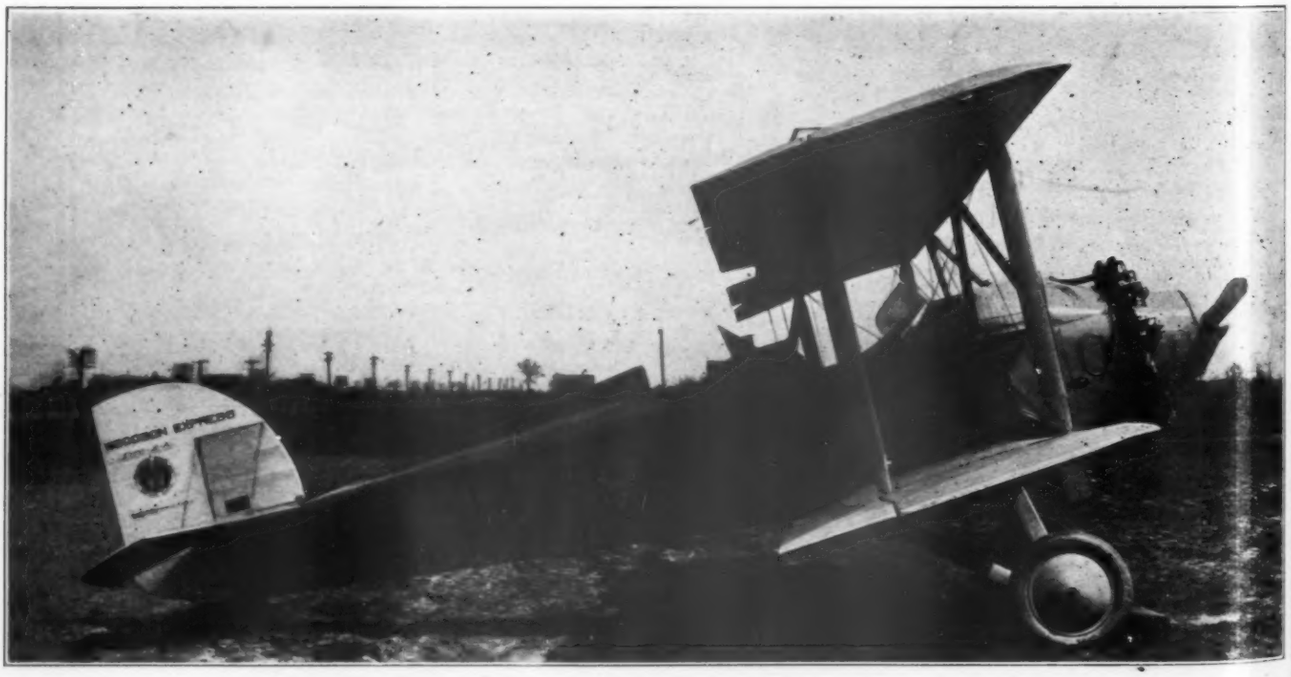
Eberhart Aeroplane & Motor Co., Inc.

812-22 East Ferry St. Buffalo, New York

Thomas Morse all-metal corps observation plane O-6 (Liberty)



The Swallow mail plane with the Curtiss C-6 engine. This machine is now equipped with the Wright Whirlwind engine.



The Woodson Express 2-A, three-seater (Wright Whirlwind)

Safe, Sane, Simple, Efficient and Economical Airplanes

Read and decide for yourself who are doing the big things in the development of aviation in the United States:

In U. S. Navy Design Competition for best Ship Board Airplane, March 1921, there were 42 Competitors. ***G. Elias & Bro. Inc.*** were awarded 2nd prize of $10,000.00.

In 6 Army Design Competitions in which the 3 best Designs were awarded prizes, ***G. Elias & Bro. Inc.*** were awarded prizes as follows:

Types of Planes		
Training	June 1920	$3000.00
Armored Ground Attack	Nov. 1920	4500.00
Corps Observation	Aug. 1921	3000.00
Twin Engine Bomber	May 1922	3500.00
Transport	Mar. 1923	500.00
Four Engine Bomber	April 1923	3500.00

Nine different Types have been developed, built and flown by us, all of which were successful.

Airplane Parts

Commendations have also been received for the following parts:
On Fuselages: Information Circular No. 517 Issued by U. S. Air Service June 1925:
"First in minimum angle of Twist . . . . Therefore this Fuselage (NBS-3 Elias Twin Engine Bomber) is the most rigid of the three in regards to torsion."

Armament

Information Circular No. 481, Air Service, U. S. A. Circular Issued for July, August and September 1924:
"An air test was made on one of the new production Type A-3 External Bomb Racks manufactured by G. Elias & Bro. Inc., Buffalo, N. Y. and installed on an MB-3A Pursuit Plane, to observe the action of the Bombs when released during a dive. The test consisted in dropping separately five Mark III (Cooper) fragmentation Bombs. As observed from another airplane, the rack functioned satisfactorily in that all bombs released properly and cleared the airplane structure. An unsuccssful attempt was made to take slow motion pictures (multiple speed) of the test."

Propellers

Information Circular No. 484, Air Service, U. S. A. Issued first Quarter 1925:
"Among the problems which have been successfully solved in the construction of this Airship (RS-1 Semi-Rigid Dirigible), are the development of large duralumin columns of 100,000 pounds compressive strength, a dual transmission of Liberty Engines, a new type of nose cap, and what are perhaps the largest ever built, Propellers measuring 17 1-2 feet in diameter."
These Propellers were built by ***G. Elias & Bro. Inc.***

For Safe, Sane, Simple, Efficient and Economical Airplanes

G. Elias & Bro., Inc. Aircraft Department — General Office and Plant Buffalo, N. Y.

imagine the 75 employees at present engaged in engine develpment and construction with the company, being considerably augmented when the demand for airplane engines so warrants.

Ryan Airlines

Ryan Airlines, for five years operators of commercial flying fields on the West Coast and for sixteen months operators of one of America's pioneer passenger air transportation lines, namely, the Los Angeles-San Diego route, which has been operated as a commercial proposition on a daily schedule with the utmost success, have recently entered the field of aircraft manufacturing.

The present plans of the Ryan Airlines call for the immediate acquisition of a factory of at least 13,000 sq. ft. of floor space, but in the meantime the great out-doors of Southern California is being used as an assembling plant and the 126 mile airline route between Los Angeles and San Diego forms the 'measured mile' for the testing of new products.

The success of the Ryan M-1 monoplane need not be emphasized here but it is significant as incorporating the experience gained in the scheduled operation of the Los Angeles-San Diego air route. The men behind Ryan Airlines realize the short comings of the faithful Hisso-Standards and had pictured a plane with a little more speed, a little more safety and a little more economy for daily operation. The result has been the M-1 equipped with the Wright Whirlwind or the Super-Rhone engine, with accommodation for two people and baggage.

Since the Ryan M-1 was produced last March, orders for this plane are said to have averaged ten per month, and it is for this reason that the proposed expansion of the company is anticipated. The men behind Ryan Airlines, T. C. Ryan, president; B. F. Mahoney, treasurer; and J. B. Alexander, factory sales manager, are fully appreciative of the possibilities of aviation and the M-1 monoplane is undoubtedly only the forerunner of more types to come.

Sikorsky Manufacturing Corp.

The name of Sikorsky was associated with giant airplanes from quite early days in Russia, and it is not surprising, therefore, that one of the first planes turned out by the Sikorsky Company, under the direction of Igor I. Sikorsky, was a twin-engine passenger plane of large size, the S-29, which has flown in almost all parts of the eastern and middle Western states. One of the company's more recent products, the S-31, fitted with the Wright Whirlwind engine is now being used extensively for survey work in South America and the Sikorsky trans-Atlantic plane S-35 will make its appearance shortly.

Swallow Airplane Manufacturing Co.

In February, 1920, the Swallow Airplane Manufacturing Company, of Wichita, Kansas, was formed for the purpose of producing commercial airplanes, and since that time has developed what has proved to be one of the very best commercial three-seater low powered airplanes produced in this country. Swallow planes have gone through a period of continual development and the present New Swallow with the Curtiss OX-5 engine is in very extensive use throughout the country. The plane is one of those which is responsible for so much of the "aerial service" which is going on.

Recently, the New Swallow mail plane was produced, it resembling the standard plane in most respects but being fitted with the Curtiss C-6A engine and having the forward cockpit covered over to form a mail compartment. It is particularly interesting to note that Walter T. Varney, when he had secured the Post Office contract for the Elko-Pasco air mail route, chose New Swallow mail planes for operating the service and has had these equipped with the Wright Whirlwind air-cooled engine. This forms a very serviceable and reliable combination and there would seem every reason for expecting even more New Swallows to materialize.

The company operates an excellent flying field of about 40 acres provided with a night landing light, at Wichita. To date, the Swallow Airplane Manufacturing Company has produced no less than 225 planes, including two experimental machines, and production is now at the rate of 8 to 10 machines per month, in the 12,000 sq. ft. factory with the 28 expert hands the company now employs. It is interesting to note that new designs contemplated by the company include a combination mail and passenger plane and a military primary training machine.

Thomas-Morse Aircraft Corp.

As long ago as 1912, in Ithaca, N.Y., the Thomas Brothers Aeroplane Company was created, together with the Thomas School of Aviation. Since that time the company has been one of the most active constituents of the American Aircraft Industry, becoming the Thomas-Morse Aircraft Corporation in January, 1917. The present officers of the company are, F. L. Morse, president; B. D. Thomas, vice-president; Raymond Ware, secretary; and J. A. Fried, treasurer. During the days before and during the War the company was most active in producing airplanes of many and varied types together with several extremely interesting engines. The size of the organization was naturally inflated by the War period when it included something like 1200 factory workers, but on a peace-time basis with a factory of approximately 20,000 sq. ft. and employing 85 expert hands, capable of rapid expansion where necessary, the Thomas-Morse Aircraft Corporation is upholding its past reputation to the full.

In looking back over the past products of the company it is impossible not to be impressed with the variety of these,—airplanes of the pusher and tractor type in the early days and high performance fast looking scouts such as the S-4, the S-5 (the seaplane type) and the MB-3 fighter, not to mention a number of others and the various Thomas engines which were so successful in their time. In all, no less than 30 experimental planes have been produced and 900 production machines together with 4 experimental engines and 150 production engines. The present Thomas-Morse O-6, the all-metal Corps Observation plane is the culminating result of this extensive past experience.

Travel Air Manufacturing Co., Inc.

Another of those companies to which so much credit is due for the commercializing of the airplane is the Travel Air Manufacturing Company, of Wichita, Kansas. Formed in February, 1925, with C. V. Cessna, president; Walter H. Beech, vice-president and general manager; W. R. Snook, secretary; and Lloyd Stearman, treasurer, the company has, during this comparatively short time, developed in all 30 experimental planes and 9 production machines. The standard three-seater Travel Air with Curtiss OX-5 engine is well-known in its class and in all air meets in which it has taken part during the past year it has won prizes. Another plane produced by the company is the Travel Air Special, a modification of the OX-5 plane to take the Curtiss C-6 engine. It will be remembered that the Travel Air Special flew in the 1925 Airplane Reliability Tour.

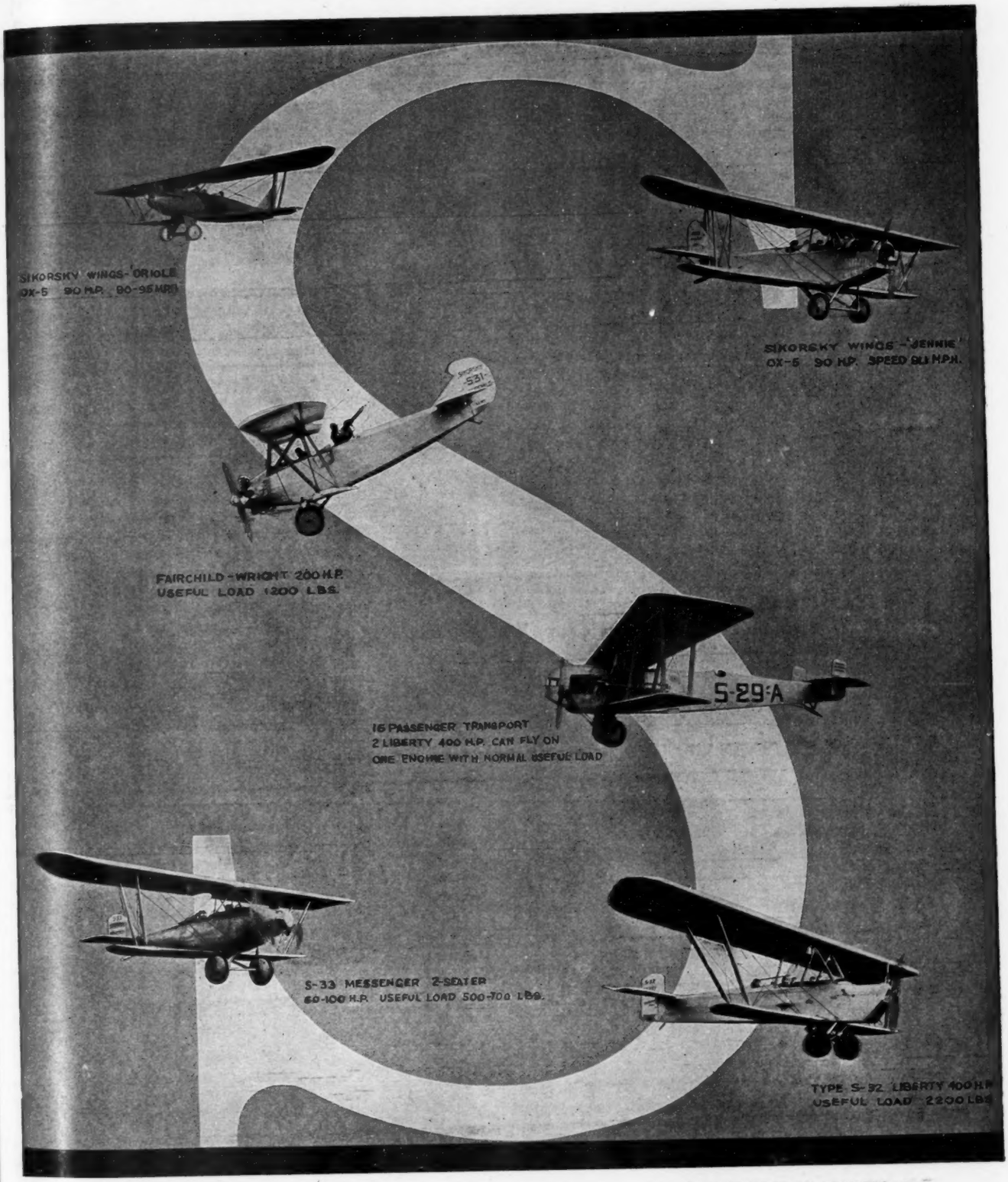
Undoubtedly one of the most interesting airplane developments at the present time is the new four-passenger and pilot cabin plane which is also suitable for mail transportation, owing to the comparatively spacious cabin. This plane is fitted with either the Wright Whirlwind engine or the 180 hp. Hispano-Suiza.

The Travel Air Manufacturing Company maintains a very fine flying field of 120 acres with 11 hangars and is very suitably equipped with manufacturing facilities.

Chance Vought Corp.

The Chance Vought Corporation, of Long Island, N.Y., was incorporated in May, 1922, and is under the direction of George W. Vought, president; Robert B. Knowles, vice-president; Ena Lewis Vought, secretary-treasurer; Chance M. Vought, chief engineer; C. J. McCarthy, engineering executive; and E. H. Herbig, general manager. While the company is of recent origin it should be remembered that the

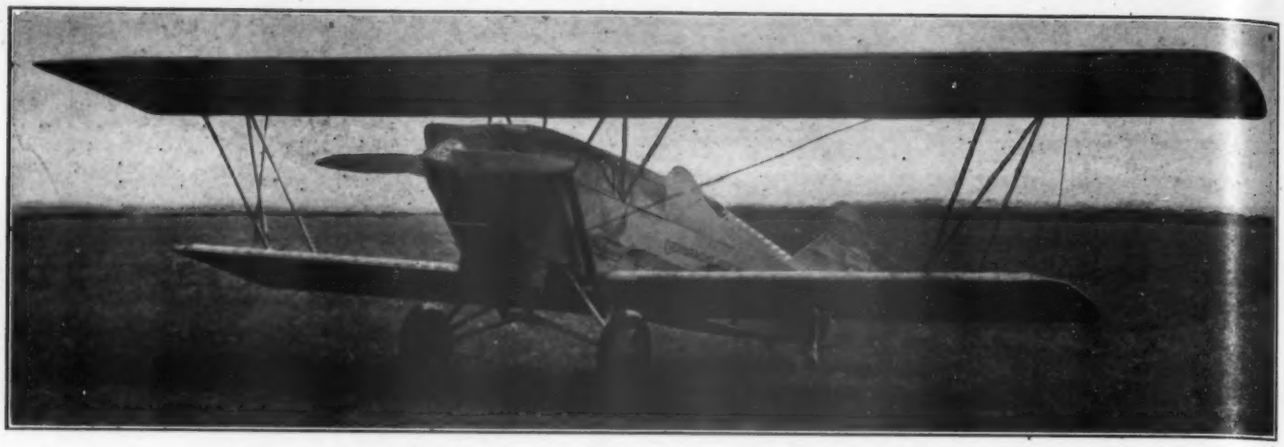
SIX SIKORSKY SUCCESSES


SIKORSKY WINGS - ORIOLE
OX-5 90 H.P. 80-95 M.P.H.
SIKORSKY WINGS - JENNIE
OX-5 90 H.P. SPEED 80 M.P.H.
FAIRCHILD - WRIGHT 200 H.P.
USEFUL LOAD 1200 LBS.
S-29-A
16 PASSENGER TRANSPORT
2 LIBERTY 400 H.P. CAN FLY ON
ONE ENGINE WITH NORMAL USEFUL LOAD
S-33 MESSENGER 2-SEATER
60-100 H.P. USEFUL LOAD 500-700 LBS.
TYPE S-32 LIBERTY 400 H.P.
USEFUL LOAD 2200 LBS.

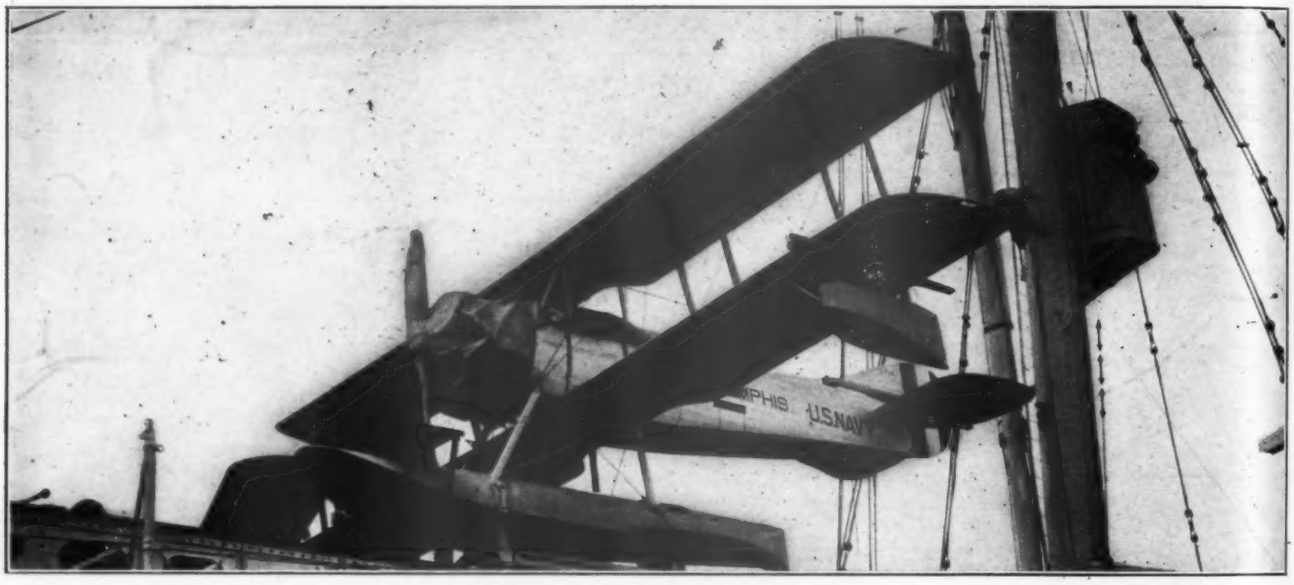
SIKORSKY MANUFACTURING CORPORATION

250 WEST 57th ST., NEW YORK

ROOSEVELT FIELD, LONG ISLAND



The new Travel Air (Hispano-Suiza, 180 hp.) dual purpose cabin passenger or mail plane



A Vought UO-1 (Wright Whirlwind) on the catapult of the cruiser U.S.S. Memphis

The Douglas O-2 observation plane of the Air Service, in which E. S. Evans and Linton Wells completed the last lap of their race around the World in the record time of 28 days, 14 hr. 36 min. 5 sec., when they arrived at Mitchel Field, N.Y., on July 14.

BOEING AIRPLANE COMPANY

Manufacturers

of

Military and Commercail Aircraft

Seattle, Washington

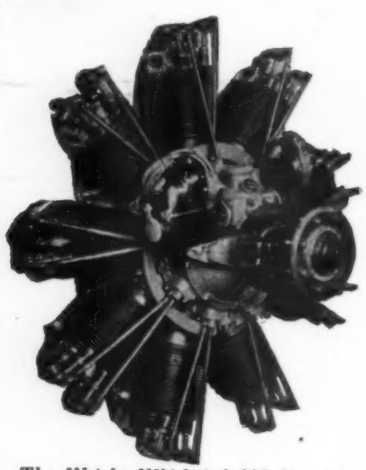
Chance Vought Corporation was the successor of the Lewis and Vought Corp. which was created during the War.

The Chance Vought Corporation has been very active since its origin and is at the present time employing 175 hands in its factory of 48,000 sq. ft. manufacturing space in carrying out its production orders for the Government. The company has produced four experimental planes and 349 production machines, all of which are well-known in the aeronautical field. It will be remembered that the Vought VE-7 which was produced during and subsequently to the War, won the Air Service competition for standardized training planes and a large number of these machines were delivered to both the Army and the Navy. Then came the VE-9, which was developed for the Navy as an advanced gunnery training plane, convertible from land to seaplane type, and which has been used extensively in catapulting work and on the carrier U.S.S. Langley. But perhaps no Vought production is so well-known as the UO-1, the two-seater observation convertible land and seaplane type. This machine is part of the standard equipment of the Navy and, equipped with the Wright Whirlwind engine, is used extensively on the Langley and other ships.

That the Vought Company is maintaining its high reputation is shown by the interesting new designs now being developed. The new UO-3, a training fighter, is now in production for the Navy, while a two-seater all-metal plane is also being built for the Navy. In the commercial line, the Vought Company is engaged in the design of a multi-engine passenger plane involving many entirely new features and which, it is understood, is to be manufactured abroad.

Wright Aeronautical Corporation

The Wright Aeronautical Corporation of Paterson, N. J., while organized in its present form as recently as 1920, is, as is well-known, one of the real pioneers of the American Aircraft Industry, being the direct descendant of the original Wright Company formed by Wilbur and Orville Wright. The company became the Wright-Martin Company, which was so active during the War, before it took on its present reorganized form, under the direction of Richard F. Hoyt, chairman of the Board of Directors; Charles L. Lawrance, president; Guy Vaughan, vice-president and general manager; J. F. Prince, secretary and treasurer; E. T. Jones, chief engineer; and C. G. Peterson, assistant to the president.



The Wright Whirlwind 200 hp. air-cooled engine

The Wright Company has long given its major attention to the design and construction of aircraft engines and these engines have for many years enjoyed a worldwide reputation for excellence of design, construction, and reliability. During the War the Wright Hispano-Suiza engines of 150, 180, and 300 hp. were used extensively and are still in use to this day, while the number of Wright Whirlwind air-cooled engines which are being used commercially in this country at this time gives this engine, in its power class of 200 hp., almost a monopoly. In this connection, it is interesting to note that the Wright Whirlwind engine is being used on six out of the present twelve contract air mail routes being operated throughout the country. It is hardly necessary also to mention that, with a power plant consisting of three of these Whirlwind engines, Commander Byrd recently flew to the North Pole and back from Spitzbergen.

Nor is the Wright Whirlwind engine used solely in commercial work for it will be remembered that the engine was primarily designed to meet the particular requirements of the Navy and as such is the naval standard for the 200 hp. class.

The Wright Cyclone P-2, 450-500 hp. engine, also of the air-cooled type, forms the supplement to the Whirlwind in that it represents the most up-to-date ideas in design, carried out in practice to the fullest extent in the production of an air-cooled engine of the 500 hp. class. At the other end of the power scale, is the Wright Moorehouse 25-30 hp. two-cylinder horizontally opposed air-cooled engine, the smallest engine of its type produced in America.

Going into still higher powers, the Wright Aeronautical Corporation, which covers, in its products, the entire aeronautical power plant field, produces the Wright Tornado T-3 water-cooled engine of 550-650 hp., which has also met with great success in practice. Covering, therefore, as it does, such a wide field in the production of aircraft engines, it is not surprising that the Wright Aeronautical Corporation, in its large and up-to-date factory at Paterson comprising more than 110,000 sq. ft. of manufacturing floor space, is continually working at full pressure, employing 675 expert hands in engine building to maintain steady production. In all, the Wright Aeronautical Corporation has built no less than 1498 engines since reorganization in 1920, while the Wright-Martin Company built a total of 6200 engines, making a grand total of 7698 complete engines.

In the manufacture of airplanes, the Wright Aeronautical Corporation has also been active, having produced a number of experimental planes primarily for the purpose of demonstrating its engines. Having made such an outstanding success of the air-cooled engine and being a pioneer in this field it seems natural to learn that the experimental engineers of the Wright Company are very actively engaged in designing new engines, specializing in the air-cooled principle, which will cover the entire power range and serve the increasing demand in both commercial and military fields. It is understood that certain new designs are already completed and production will be watched for with the closest interest since past successes are bound to be reflected in the future products of the Wright Aeronautical Corporation.

Woodson Engineering Co.

The Woodson Engineering Company, of Bryan, O., which was organized in August, 1924, has, as its present officers, O. L. Woodson, president; A. D. Stock, Jr., vice-president; P. H. Downs, sales manager; and G. K. Hood, general manager. The company operates a factory of approximately 9000 sq. ft. of floor space and employs at the moment 25 employees, engaged in the manufacture and maintenance of airplanes. The company also operates a very good airdrome.

Altogether, since its organization, the Woodson Company has turned out one experimental plane and fifteen production machines. The Woodson Air Express, 2-A, and the Woodson Transport, 3-A, both equipped with the Wright Whirlwind engine, are each very excellent commercial machines which have put up some very good performances, the most recent being the winning of the speed race in the 1926 Flint Air Meet, by the Woodson Air Express machine.

Yackey Aircraft Co.

The Yackey Aircraft Company, for the operations of which W. A. Yackey, is entirely responsible, has been extremely active in the aircraft field for a number of years, both in airplane manufacture and in maintenance and aerial service activities. In fact, to the Yackey Company is largely due the credit for the early aerial service operations which have now developed into what might almost be called a nationwide industry. It will be recalled, of course, that W. A. Yackey is a former Air Mail pilot of very considerable experience. It is not surprising, therefore, that the Checkerboard Flying Field, the Yackey airdrome, is one of the best organized and operated commercial fields in the country.

The Yackey Aircraft Company have produced several very interesting planes which are being extensively used and include the Yackey Sport, the Yackey Transport, one of which is now being used by the Stirling Expedition in New Guinea, and the Yackey Cruiser.

The INDEPENDENCE COMPREHENSIVE AVIATION COVERAGE

THE INDEPENDENCE COMPANIES
INDEPENDENCE BUILDING ~ PHILADELPHIA
CHARLES·H·HOLLAND ~ President

"ALL-IN-ONE"

FIRE, LIGHTNING & TRANSPORTATION

ACCIDENTAL DAMAGE

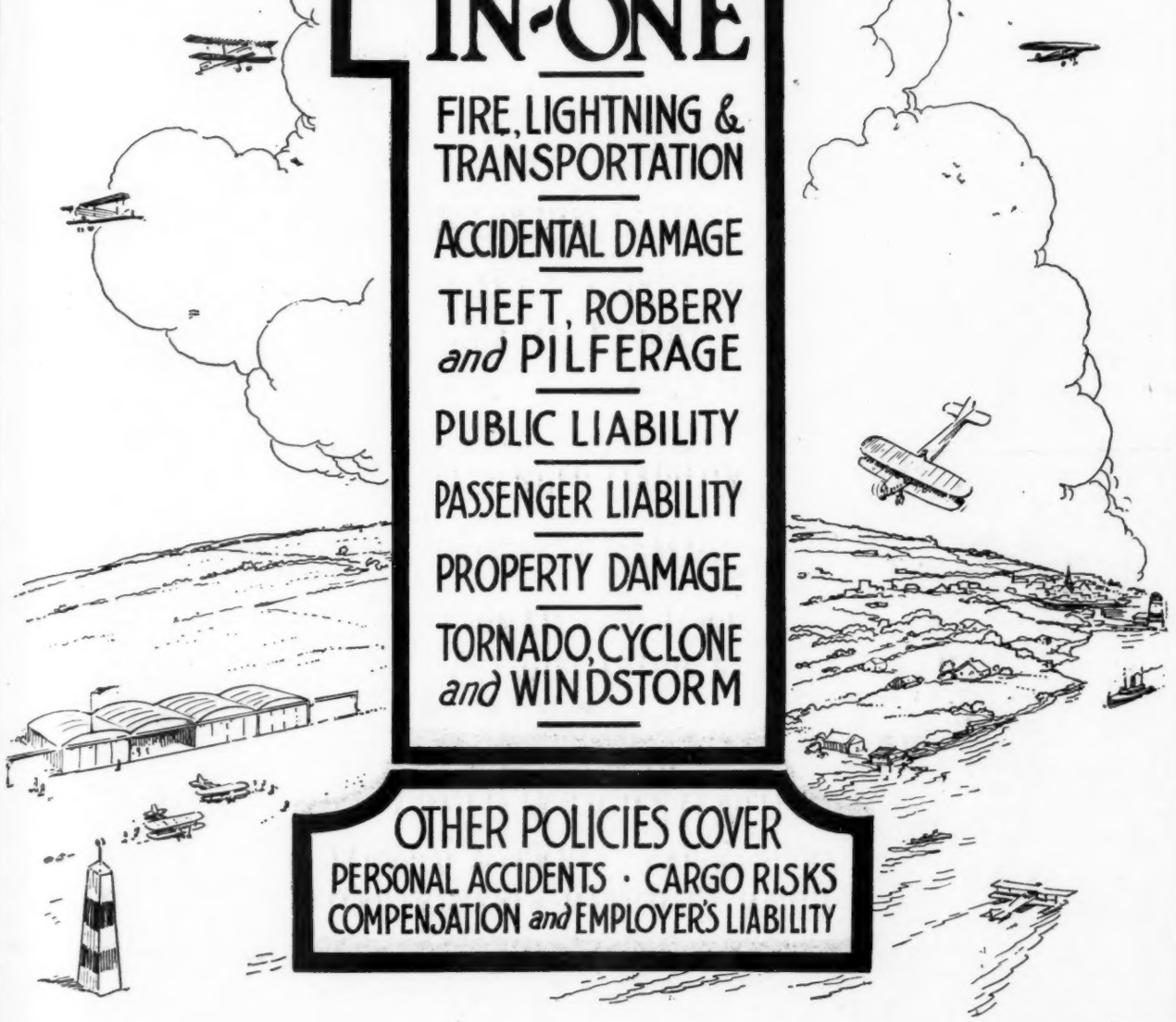
THEFT, ROBBERY *and* PILFERAGE

PUBLIC LIABILITY

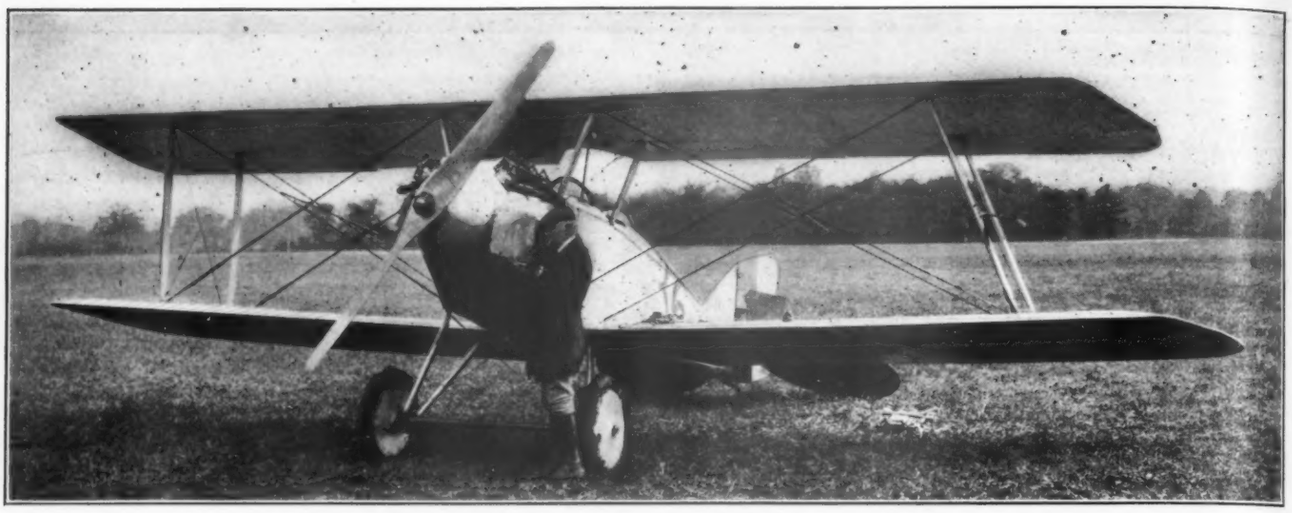
PASSENGER LIABILITY

PROPERTY DAMAGE

TORNADO, CYCLONE *and* WINDSTORM

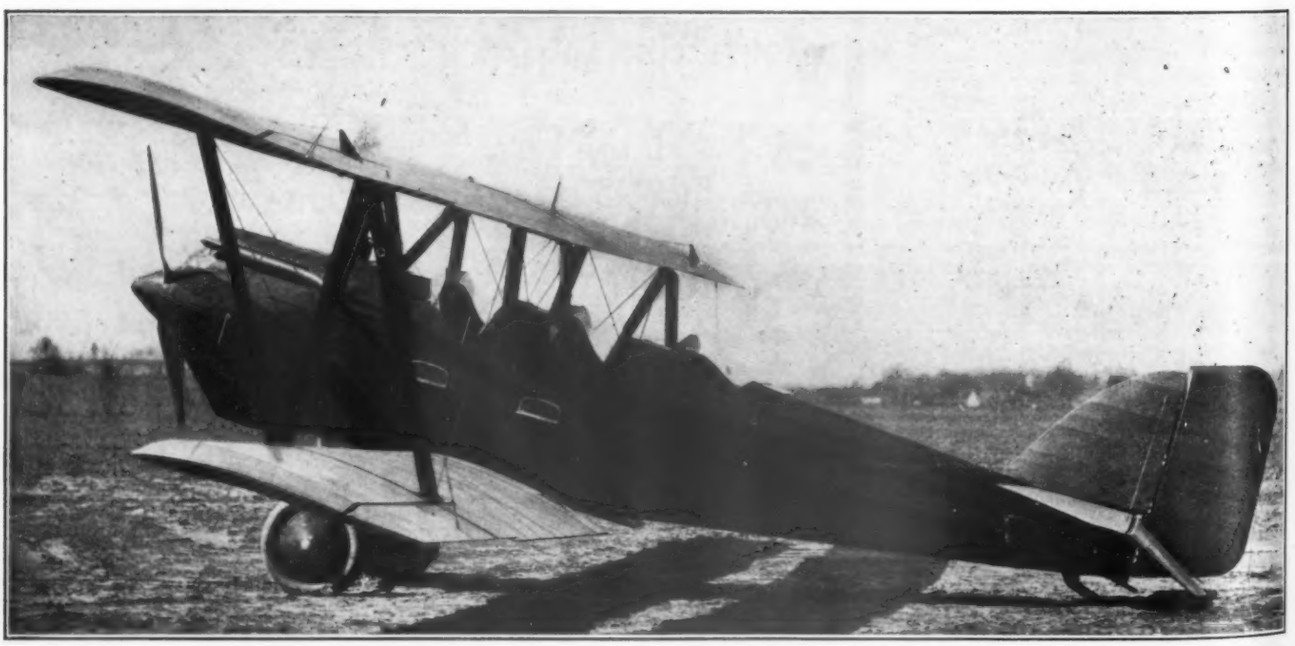


OTHER POLICIES COVER
PERSONAL ACCIDENTS · CARGO RISKS
COMPENSATION *and* EMPLOYER'S LIABILITY



The Yackey Sport plane (Curtiss OX-5)

The Alexander Eaglerock (Curtiss OX-5) three-seater plane



The Pitcairn Fleetwing (Curtiss C-6, 160 hp. engine) five-seater passenger plane

THE

ADVANCE AIRCRAFT CO.

LARGEST PRODUCERS OF COMMERCIAL AIRCRAFT IN AMERICA ANNOUNCE

PRICE REDUCTION

ON THE IMPROVED

WACO-9

THREE-SEATER

$2250.

AT TROY, OHIO

More WACO'S are now in service for profit and pleasure than all other planes now in production in America.

THE PERFORMANCE MADE THE DEMAND

Write for Details

THE ADVANCE AIRCRAFT COMPANY
TROY, OHIO

Ten Years of Civil Aviation

A Review of American Civil Aviation Indicates the Favorable Prospects Ahead.

By EARL D. OSBORN

THE BRITISH phrase "muddling through" could well be applied to the development of civilian aviation in the United States. While Europe has been developing a network of airlines through a system of generous subsidies, this country has, until this year, been content with its one air mail line and has allowed commercial aviation to grow up according to its own sweet devices. This country alone of all the great nations has had no system of fostering commercial aviation, but, equally important, it has had no laws which might curb the natural growth. Ten years ago there was practically no civilian flying in this country except that done by a few exhibition fliers. Ten years later we find, besides the air mail lines, a well established industry based on "Aerial Service" and a group of pilots who fly in the neighborhood of 10,000,000 miles per year. As shown by the figures brought out by AVIATION on the amount of flying done in this country during 1925, we have more civilian planes and pilots and they do more flying than in any other country. The development of "Aerial Service" to such an extent is unique to this country and the cause of the growth deserves to be studied.

Causes of Growth

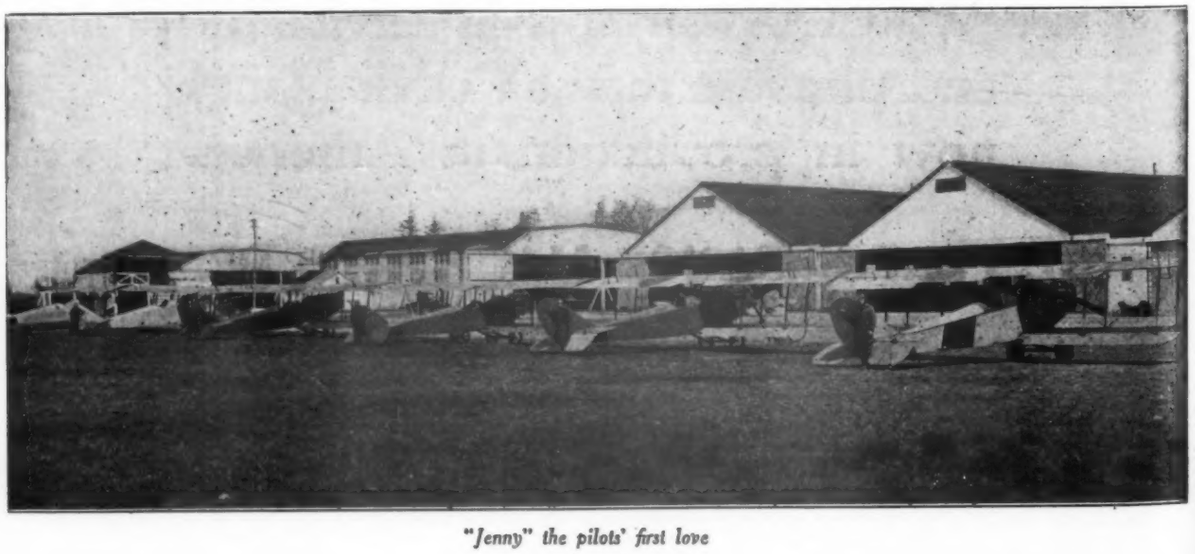
In comparing the growth of civil aviation in the United States with that in Europe it must be remembered that, taken as a whole, the individual in this country is very much wealthier than the citizen of Europe. Not only could the purchase of planes by individuals be easily financed but passengers had the money to pay well for joy rides and companies had the money to pay for advertising stunts and for aerial photographs. Money, however, is not the only factor in the growth of American civil aviation. The blood of the pioneers still tingles in our veins and the adventure and thrill of flying tempts Americans more than it does Europeans. This is shown most definitely by the large proportion of Americans who patronize the European air lines and, furthermore, especially throughout the West, the proportion of the population which has flown is much greater than in any foreign country. Americans are great travelers and they take to the airplane just as they have taken to the automobile.

The great level stretches of the Mississippi Valley forming, as this region does, one enormous landing field where inexperienced pilots and under-powered planes can fly in safety has been an enormous stimulus. The climate, even of the Eastern states, is better for flying than that of most of Europe while in California perfect weather prevails at all times. Theoretically, the great distances and the many districts where no developed transportation system exists should have been a great stimulus to the growth of civilian aviation. In matter of fact, however, this factor has not been very pronounced. The proportion of revenue derived by "Aerial Service" companies from long cross country flights carrying passengers is comparatively small.

War Surplus Equipment

Following the War, the Army had vast quantities of aeronautical material which they sold to civilians at prices which ran from ten to twenty per cent of the original cost. As compared to modern equipment this material was inefficient from an operative point of view and from the aerodynamic viewpoint it was obsolete and dangerous. What would have happened if this vast amount of material had been destroyed is problematical but its release has certainly been the chief factor affecting the growth of flying in this country. For a long time it looked as if this cheap equipment would completely stifle the growth of any manufacturing of civilian planes in this country.

Using this inefficient equipment put very definite limits on what could be done by the fliers in this country and it is amazing that they could learn to make money with such planes. Out of the large number of war trained pilots who bought the cheap planes, a small proportion learned how to operate and maintain planes and developed certain kinds of business which were actually profitable. These few successful operators realized that more efficient equipment was necessary and experimented with all sorts of makeshift planes which would be a little better than the surplus war material. A few went further and acutally designed and built new planes which would meet the requirements of the business which had been built up on the surplus material. Growth at first was slow but, with the rise in price of the war surplus planes, the deterioration in their quality and the realization of the greater efficiency of modern equipment, a boom came and there are now several manufacturers devoting their energies entirely to civilian work and producing a considerable number of planes. Estimates indicate that more planes will be built in 1926 for civilian and commercial use than for either the Army or the Navy, though, of course, the cash value will not be so great. The larger number of these planes are powered with Curtiss OX engines and there is no doubt that this cheap and reliable power plant has been a most valuable asset to American aviation.



"Jenny" the pilots' first love

NAVAL or COMMERCIAL FLYING MADE PRACTICAL

by the

GIBBONS LANDING AND LAUNCHING DEVICE

A PROPOSED APPLICATION TO MODERN STEAMSHIP PIERS

THE GIBBONS LANDING AND LAUNCHING DEVICE CAN BE USED ON Buildings, Battleships, Ocean Liners, Public Buildings, Post Offices, Municipal Stations, Hospitals, Theatres, Isolated Places and Rocky Mountains.

This device will take only four men to handle and it will not cost or weigh more than a 16″ gun.

Any battleship can use four of our landing and launching devices at one time, and can land or launch four planes at the same time.

The present aeroplane carrier can land or launch only one plane at a time.

Our device will make every ship its own carrier.

The two battleships which a foreign Government is now building will be constructed to be their own carriers, which means to regulate the aeroplane to floating repair, machine shops and storage.

The U.S.N. carrier Langley requires 15 officers and 280 men plus their upkeep, and cost over one-half million dollars to remodel and equip.

Ocean liners can have one or two landing and launching devices of our type to land and launch planes.

Admiral W. A. Fullam, on November 10, 1924, made the following remarks: "I forsee the carrying of planes by Ocean Steamers to leave the ship when near land with express mail and passengers, saving a day or two. Landing decks on good sized steamers are perfectly feasible."

We claim if the aeroplane carrier is disabled while accompanying the fleet when in action what then? But if every ship of the fleet can have one to four landing and launching devices this will make every ship its own carrier and not interfere with the gun fire.

It has been subjected to thorough and extensive research work, etc., by the aeronautical bureau of a foreign government for the period of eight months and has proven to be very efficient in every detail.

Through the aeronautical research and experimental department of a well known U.S. university in charge of their professor of aeronautics, after a severe test of six weeks on the model, it proved that it can do what is claimed, function in landing and launching—a space saver.

The device is the result of intensive study and experimentation since 1919 by its inventor, Mr. R. J. Gibbons, assisted by a staff of naval, electrical, mechanical, aeronautical and structural engineers.

The efficiency of this device has been complimented on by professors of aeronautics, also by noted aeronautical engineers and fliers (not in our employment) who have seen the working of our model. Their letters to us state that our invention will play one of the greatest parts in developing commercial aviation.

The municipal landing port or commercial landing facilities and storage will be in the near future a skyscraper hangar for the storage of planes on each floor the same as our tall garages have now to accommodate cars, with elevators from roofs and ramps.

Arthur Brisbane in his editorial on Sept. 13, 1925, said: "Not far in the future will come the new city, one building, devoted to one single business, with a landing roof. The congested traffic problem may be solved from the roof before it is solved in the street."

Patented in the United States and Foreign Countries

Further Information to Responsible Persons Upon Request

THE GIBBONS COMPANY

Builders, Established 1869

343 COLUMBIA STREET, BROOKLYN, N. Y.

It is practically impossible to give an accurate account of the growth of "Aerial Service". It developed in different ways in different parts of the country and its history is the history of countless individuals. Immediately after the War, before the government had fully turned loose its flood of surplus equipment, was the hey day for those who could obtain planes. The public all wanted to go up with the heroes of the War and were willing to pay the price demanded. The gypsy flier barnstormed his way from city to city and from village to village. With the release of more equipment, others joined this profitable and exciting method of making a living and the old-timers claimed that the business was being spoiled. The people grew less keen, too. The glamor of the "super-men" was fading and exhorbitant rates could no longer be charged. Flying became a business and rather a cut-throat business at that. Gradually, those fliers with a little more ability than their brothers, obtained a fixed base from which to operate. To be successful in meeting competition and making a living they had to have more efficient planes, but above all, they had to develop new forms of business.

The Army's Contribution

Much of the pioneering work in the development of new business was done by the Army. Aerial photographs had proved their value during the War but actual map making was still far from perfect in a rudimentary form. The Army has done much to perfect map making and to bring to the minds of the public the value of air maps and of obliques of factory sites, buildings, estates, etc. The Army did the first cotton dusting and bore much of the initial expenses of the development work. In the matter of navigation and the development of model airways, the Army has done work which is only gradually being recognized.

The Air Mail

The air mail will be celebrating its Tenth Anniversary in two years. It was started in 1918 between New York and Washington and from that time on its history has been one of steady growth and progress. Within a year of the first flight the DH had been adopted as the type of plane which was best suited and, a service was opened between Chicago and Cleveland but the New York and Washington service was not given up until 1921. In July, 1919, the service was extended through from Chicago to New York and during the next winter it was extended to Omaha. The continent was finally spanned by the air mail in Sept. of 1920. Experiments in night flying were initiated as early as 1922 but the regular night flying schedule was not established until 1924. The night airway was from Chicago West as this was considered to be the easiest stretch of country. The night flying link enabled the air mail to be carried all the way across the continent without recourse to train relays. In 1925 the New York-Chicago airway was lighted. More detailed histories of the air mail can easily be found but this brief outline demonstrates the continuous progress which has been made.

The air mail has operated a longer route for a longer period of time than any other air line in the world. It has done a hard job and has produced splendid results which will be appreciated by the air lines of the future.

Private Air Lines

In America, as in Europe, immediately after the War, the tendency was all toward establishing air lines for the transportation of passengers. Many of these were planned but none could raise the money nor get the equipment necessary. The one exception was the Aeromarine Airways which made a sporting attempt to operate large flying boats but it can scarcely be said to have operated for sufficiently long periods or with sufficient regularity of schedule to be classed as a real air transport line.

With the continued success and growth of the air mail, there was a persistent demand for the letting out of air mail contracts by the Post Office Department to civilians. Two special contracts for the delivery of mail by plane to steamers were in operation for a couple of years but it was not until the Kelly bill was passed in 1925 that it became possible to develop contract air mail lines on any scale. There are now eleven air mail contract lines in operation and more are about to start. The history of these lines is still hidden in the future but they are certainly a step in the right direction. It is probable that the year 1926 will be considered as the birthday of aerial transportation in this country.

The Future

It is almost impossible to close a revue of ten years of civil aeronautic development without trying to glimpse into the future. There is almost certain to be a steady progress along lines already established. As the OX and Hisso engines helped create aerial service and the Liberty and the Navy's contribution of the Wright Whirlwind engine helped establish air transport, so the growth in the future will largely depend on the cost and efficiency of the power plants. With a cheap, light and reliable power plant, aerial service will continue its growth and develop many new uses which could not be handled with the inefficient planes of the past decade. Improvements in the safety and the lower operating cost of planes will greatly stimulate their use by private owners. The establishment of airports and air navigation facilities is going on rapidly and it is probable that, within the next ten-year period, every town will acquire a landing field.

Aerial service has gone through its period of early troubles. The air transport lines, however, have still to go through their pioneering troubles. Judged by present indications these will be fatal to some of the lines while others are even now showing that sufficient revenue can be obtained to operate an air line. It is safe to say that the increased efficiency of planes and engines will cause a gradual growth of air transportation and that by 1936 it may have reached enormous proportions. Aviation would be a dull business if the possibilities of a revolutionary discovery were eliminated but even judging the future by the growth in the past the future is alluring enough.

The Liberty engined DH which so faithfully served the Air Mail

AIRPORTS AND AIRWAYS

St. Joseph Tells Kansas City the Reason Why

To the Editor of Aviation:

In your issue of July 5, under the head of "Kansas City News", by R. S. Knowlson, we quote the following as an excerpt of same which we feel requires an answer, as it really asks for the reason why.

> "The Mail pilots on the run from Kansas City to Chicago *all want to know why* the extreme difference in weather in the comparatively short distance between Kansas City and St. Joseph. Leaving here in calm weather, they nearly always find high winds at St. Joseph, they say, if not something worse. Even Kansas City's meteorological oracle, P. Connor, has failed to satisfactorily explain the matter."

(When you have nothing else to talk about—always talk about the weather.) We are glad of the opportunity afforded us to enlighten Mr. Knowlson and all other Kansas Cityans concerned, and likewise to be of some assistance to Kansas City's meteorological oracle, Mr. P. Connor, as it is a well-known fact that if is St. Joseph's desire and purpose to disseminate, unselfishly and helpfully all the information she possesses for the furtherment and development of aviation, so here goes:

Speaking from the standpoint of a layman, and not as a meteorological expert, I am constrained to say that the calm prevailing around Kansas City's leased, or borrowed air port is due to the inactivity of its populace in matters pertaining to aviation.

We admit that the atmosphere in St. Joseph is so charged and permeated with enthusiasm and activity, in matters pertaining to aviation, which has reached our municipally owned air port (the finest in the world) and perhaps is finding its way heavenward so as to bring about just a little bit more atmospheric disturbance than could possibly occur in the neighborhood of Kansas City, where there exists such a lethargic calm, self-satisfied, inactive "bunch" who are supposed to be backing aviation at the mouth of the Kaw.

We haven't consulted the head of our Weather Bureau here, and are not giving this out as the official reason, but we feel quite sure that he would agree with us in the matter.

There might be another reason for it, as we note Mr. Knowlson states that the mail pilots encounter this on the route from Kansas City to St. Joseph, and the condition may be somewhat aggravated because of the small amount of air mail Kansas City is sending eastward. It is our belief that this atmospheric disturbance Mr. Knowlson speaks of might not be near as perceptible if Kansas City would meet her quota and put that 250 pounds per day into the planes she has promised and agreed to furnish.

Anyway, the St. Joseph Aeronautic Association promises to give this complaint their immediate attention, and it may be that if the mail planes continue to leave Kansas City "too light" it will be necessary for them to supply ballast, such as ocean steamers resort to, in order to maintain the stability of the ship in passage.

St. Joseph has earned and justly won all of her laurels pertaining to aviation. She has never denied her support and co-operation to the country at large (Kansas City included) toward its promotion and development.

If we can do anything toward providing stabilizers for a

Aircraft Supplies

Our customers know about the large volume of JN and OX spares we have on hand. For the benefit of prospective customers, we wish to state that we lease a warehouse of 20,000 square feet capacity, and that it is practically full of this material. We have the largest and most complete line in the country.

To introduce ourselves to new customers and expand the volume of our business we make our

SPECIAL OFFER

10% off and no crating charges on all plane parts, except rubber and wheels, during the entire months of August and September, guaranteeing immediate shipment. The motor parts are net, except on special quotation on quantity orders. You can't afford to miss this offer. Send for Catalogue No. 3 and order according to these terms for prompt and efficient service.

MONUMENTAL AIRCRAFT, INC.

1030 N. CALVERT ST. BALTIMORE, MD.

"The Leviathan of the Aircraft Field"

plane leaving Kansas City for the east on the air mail route with a light load, please, Mr. Knowlson, just mention it and we will call our "gang" of Aviation Boosters together and come to your rescue.

CARL H. WOLFLEY,
Manager and Director,
St. Joseph Aeronautic Association

Dive Restores Voice

A laborious climb to an altitude of 6,000 ft. in an airplane and then a sudden drop restored the natural voice of Everet Brown of Kalamazoo, Mich., after six months silence.

Brown was rendered speechless early in January through monoxide poisoning whi' working beneath an automobile. All efforts to restore his power of speech were futile. Doctors examined his throat, X-Ray pictures were taken, treatments given, but not much hope was given that he could ever regain control of his vocal cords.

A Chicago specialist suggested altitude treatments. Brown said the idea "sounded goofy", but decided to try it and with James Piersol as pilot, who moved by sympathy for Brown undertook the flight in a new Swallow. After the take off Piersol said he hoped the strange experiment on restoring Brown's speech might be a success. Ten minutes of flying and an altitude of 4,000 ft. was gained. The temperature was unusually cold; warmer weather was encountered at a little over a mile, and then again it became very cold causing engine revolutions to fall off. At 6,000 ft. Piersol throttled the engine and went into a tail spin, coming down this way for about 3,000 ft. then straightened out into a steep dive which was gradually lessened at around 1,000 ft. and from there he glided normally to the ground. As the plane stopped he called out to Brown asking him how it worked and Brown called back in what seemed to be a normal voice "fine".

This is one of the few instances where speech has been restored by rapid transit from one atmospheric pressure to another. The theory advanced for the treatment is that, upon reaching rarified air, blood recedes from the surface. A sudden plunge into denser atmosphere sends it rushing back with great suddenness and force, with a possibility of relief to any congested condition that may have existed. As this happened a day before Mr. Brown's 31st birthday he looks upon the restoration of his voice as a birthday gift.

Service Flight to Venezuela

The State Department having obtained permission from foreign governments along the route, the Secretary of War has authorized the Commanding General of the Panama Canal Department to conduct a round trip flight of two Loening amphibian planes from France Field, Canal Zone, to Maracay, Venezuela. The present plans contemplate that the planes should make stops at Cartagena, Barranquilla, and Girardot, in Colombia; at Willemstad, Island of Curacao (Netherlands), and at Maracaibo, Valencia and Maracay in Venezuela. The entire flight is estimated to require about twenty days. It will constitute a most valuable service test of the operation of amphibian planes in tropical territory.

The personnel for the flight will consist of three officers and one mechanic to be selected from the following: Maj. Follett Bradley, Maj. Junius W. Jones, Lieut. Dale V. Gaffney, Lieut. Charles W. Sullivan, Master Sergeant Bernard Wallace and Technical Sergeant James Gall, all of France Field, Canal Zone.

The exact date for the start will be determined by the Commanding General, Panama Canal Department, after a study of flying conditions. The route to be followed in South America is in commercial use by the Scadta.

Learn to Fly

$100 — Including Solo

No bond required
No charge for breakage

76 Students Graduated in 1925

Eight years without an accident

Room and board near field at $10.00 per week.

We guarantee to solo our students regardless of the number of flying hours required. We also furnish planes at very reasonable rates for those who wish to qualify for the F.A.I. pilots certificate and we maintain an employment agency for our graduate pilots.

The flying school of the Robertson Aircraft Corporation is one of the oldest and best known in the United States. Our instructors are ex-army aviators and are mail pilots with wide experience and our training equipment is the best obtainable. In over eight years of operation our students have never damaged a ship in their solo flights.

The flying field is approximately six miles from St. Louis and is easily accessible by railroad, street car and hard surfaced roads. It is the largest and best privately owned field in the country and the International Races of 1923 were held there. Mail planes arrive and leave daily.

Our course requires about two weeks, depending on the individual, and after its completion the refinements of the art can be gained only from experience. Commercial aviation is a rapidly growing industry. Don't delay! Enroll now!

It is not necessary to purchase an airplane in order to take this course.

WRITE FOR BOOKLET

Guaranteed Condition Airplanes, Ready for Immediate Fly-Away Delivery, at Prices Ranging from $650.00 to $1,750.00

ROBERTSON AIRCRAFT CORPORATION

OPERATORS OF ST. LOUIS-CHICAGO UNITED STATES AIR MAIL

LAMBERT-ST. LOUIS FLYING FIELD, ANGLUM, MO.

Denver, Col.

By M. J. McInaney

A new Eaglerock was shipped to the Aero Corporation of California on July 15. This is the second Eaglerock sent them in the last 30 days. The first was sold upon arrival to C. E. Steele of Steele's Airport, Los Angeles.

A new demonstrator was shipped this week to W. L. Lamkin of Porterville, Calif. Mr. Lamkin is Northern California dealer for Eaglerocks. His flying field and headquarters are at Porterville, from which city he will work the northern part of the state, introducing the Eaglerock to California prospects.

Captain Yonge of Gary, Ind. will be in in a few days and take delivery of his second plane. His letters state that business in passenger carrying and instruction is exceptionally brisk.

The Super Rhone Eaglerock has been completed and test flown with gratifying results. It has been entered in the Ford Races with Pilot Vernier as pilot. A stock model Eaglerock with OX-5 engine is also entered and will be piloted by J. A. McInaney accompanied by myself.

Mort Fleming of the Fleming Bros. Lumber Company is doing a lot of flying. He states that he has already got five thousand dollars worth of advertising out of flying.

2,937 Mile Non Stop Flight

By a twenty-nine-hour non-stop flight from Paris to Omsk, Siberia, Captain Girier and Lieutenant Dordilly of the French Air Service beat the world's record for non-stop straight line flying, made only a few weeks ago by the Arrachart Brothers, who flew from Paris to Basra, on the Persian Gulf.

The air line distance from Le Bourget, whence the fliers started, to Omsk is 4,700 kilometers (2,937 miles), but the aviators probably covered a greater distance than this.

Girier and Dordilly used a Brequet plane, with a 500-horsepower Hispano-Suiza engine. They left Le Bourget airdrome at 5:20 July 14 morning and reached Omsk about 1 o'clock July 15, encountering bad weather in Siberia.

The previous non-stop straight line record was made by the Arrachart brothers, who flew from Le Bourget to Basra, on the Persian Gulf, covering about 2,700 miles in 26½ hr.

Starting from Hempstead, L. I., on May 2, 1923, Lieuts. John A. Macready and Oakley G. Kelly flew to San Diego, Calif., in 26 hr. and 50 min. The distance they covered was estimated at more than 2,700 miles.

Dust Gathering

According to Dr. Herbert H. Kimball, the meteorologist who makes the dust studies for the Weather Bureau, there are about 2,000 dust particles in one cubic inch of clear country air. As many as 115,000 particles to the cubic inch have been found in air samples taken in the city of Washington on a smoky morning. This amount is small compared to such cities as London where more than 500,000 dust particles to the cubic inch are not uncommon.

In studying the relative numbers of dust particles at different levels in the air, samples were taken by airplanes. In order to be sure that dust particles from the exhaust of the airplane engine did not figure in the counts, samples also were obtained by a meteorologist from a balloon at the different levels. Traces of dust were found as high as 8,000 ft. in the Summer time.

Studies also have been made to find out the vertical distribution of dust in Winter and Summer and its effect on visibility from the viewpoint of the flier.

In getting a sample of dust from the atmosphere, Dr. Kimball makes use of a device consisting of a tube lined with wet blotting paper, a small metal box containing a glass plate, and a suction pump.

By pulling the piston of the pump sharply, the sample of air is drawn into the tube, past the wet lining, through a slot into the box in which a partial vacuum has been created by the piston suction.

HASKELITE

The Waterproof Plywood

Thirty Uses in Aircraft Construction

The answers to a recent questionnaire show thirty uses to which HASKELITE is being put in aircraft construction. The following list shows these uses and the number of builders reporting each.

24 Fuselages.
19 Leading Edges.
10 Engine Bearers.
31 Flooring.
4 Tail Linings.
7 Center Ribs.
5 Tank Cover.
8 Center Cover.
2 Pontoon Parts.
2 Propeller Spinner.
8 Wing Covering in Slip Stream.
23 Bulkheads or Partitions.
8 Pontoon Covering.
10 Aileron or Elevator Surface.
32 Instrument Boards.
14 Walkway Ribs.
30 Wing Ribs.
22 Box Beams.
25 Seats.
6 Rudder.
22 Step Boards.
12 Drag Ribs.
13 End and Tail Ribs.
28 Walkway.
6 Headpads.
8 After deck Bulkheads
3 Webs and Wing Spars.
1 Bracing instead of Wire.
3 Gussett Plates on Fuselages.
1 On landing Gear Struts like Box Struts.

Bought by Practically All Builders

Practically every contractor and commercial aircraft builder in the country is using HASKELITE today, as well as all branches of the U.S. Government using airplanes. Note the following:

Advance Aircraft Co.
Boeing Airplane Co.
Consolidated Aircraft Corp.
Douglas Company
Huff Daland Airplanes, Inc.
Curtiss Aeroplane & Motor Co.
G. Elias & Bro., Inc.
U. S. Postal Service
Ryan Airlines
E. M. Laird Airplane Co.
Hamilton Aero Mfg. Co.
Johnson Airplane & Supply Co.
Lincoln Standard Aircraft Co.
Glenn L. Martin Co.
Swallow Airplane Mfg. Co.
Travel 'Air, Inc.
Chance Vought Corp.
Buhl-Verville Aircraft Co.
U. S. Navy
Stinson Airplane Corp.
Aerial Service Corp.
Goodyear Tire & Rubber Co.
Waterhouse & Royer
U. S. Army
Woodson Engineering Co.
Loening Aeronautical Engineering Corp.

HASKELITE MANUFACTURING CORPORATION

133 W. WASHINGTON ST., CHICAGO, ILL.

In passing the wet lining, any dust particles in the air drawn into the tube become saturated with moisture. When the air passes through the slot at the rear of the tube and into the vacuum chamber it is passing from high pressure to low pressure and in consequence is cooled. The cooling causes the moisture to condense on the dust particles, thus causing the latter to stick to the glass when they strike it.

These small glass plates are later placed under a microscope which magnifies each particle 10,000 diameters and enables the scientist to make a count of the infinitesimal motes.

Camden, N. J.

The Courier-Post air meet, which was postponed from its original date because of weather conditions, opened July 10 with an attendance of 30,000, and proved one of the greatest aerial events held in this section of the country. Thunder showers, which came late in the afternoon, forced the postponement of several events until the next day, but a crowd of 10,000 were on hand to witness the remaining part of the program.

Visiting pilots, who pronounced the Moro-Phillips tract an ideal site for a flying field, have given impetus to the plan of erecting a permanent airport at that place.

Thirty-six planes took part in the meet, the Martin bomber which arrived from Langley Field, with a crew of six men, attracting special interest throughout the day. The Pitcairn Fleetwing, the Huff-Daland Pelican and Chamberlain's "aerial flivver" were other planes which drew the attention of visitors.

James Ray, piloting the Pitcairn Fleetwing, captured the Courier-Post Transport Trophy for efficiency, J. P. Andrews, of Garden City, N.Y., flying a Curtiss Standard, being awarded second prize. Basil Rowe, of Keyport, N.J., in his Martinside plane, finished third, C. D. Chamberlain, with a Bellanca Special, fourth, Bob Hewitt, of the Ludington Exhibition Company, Pine Valley, Pa., in a Waco, fifth, and Jack Thorp, also in a Waco, sixth.

The race for light commercial planes with OX-5 engines of 510 cu. in. capacity was participated in by four entrants, all Waco planes. Charles Baughn, with a speed of 78.81 m.p.h., won the race, and was awarded the Morning Post Trophy and a cash prize of $100. Bob Hewitt, who finished second, also received a cup for second prize. Charles Meyers finished third and Jack Thorp, fourth.

The New York National Guard entry won the Evening Courier Race for National Guard planes and the Pennsylvania unit was given the trophy for formation flying. Bob Hewitt, Jack Thorp and Bob McBurney won this event.

An event, showing the development of the mail service from the times of the Pony Express to the present air mail facilities, proved one of the most interesting features of the program.

At the close of the meet, the visiting pilots were guests of the South Jersey Aviation Club at a banquet held in the ballroom of the Hotel Walt Whitman.

Chicago, Ill.

By Otto Klein

The excitement of the week was all centered on Stanley Wallace's Field on River Road. Several neighborhood boys broke into his shed to steal gasoline and perhaps tools, but overlooked the fact that high test gasoline and cigarettes do not get along together so well. Although several days after the Fourth of July, there was a pretty array of fireworks, and if it had not been for the Heath Airplane Company's truck just passing on its way home from the field, the Wallace Airport would have been without a shed, and almost without airplanes because the flames came dangerously near them and every one helped to push the planes into the middle of the field. The planes and tools were thus saved. The marauders were badly burnt, one of them perhaps fatally. They were arrested the following day.

J. H. Prosser and Chas. Ostrom, two of the Heath Airplane Company's students, who recently purchased a plane, sent

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HISSO PROPELLERS—Westmore. New Stock. Plain or rawhide tipped; will fit any Hisso or L6 Hall Scott, $27.50.

Only 3 Hall Scott L6 220 H. P. New, test run, complete. Wonderful motor for any ship. Excellent, easy to install in Standard. Complete and crated at $575.00.

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The above can be converted to use L12 motor at very little additional expense.

These ships have a very wonderful performance, are of duralumin construction, and land very slow. They cruise 95 to 100, carry a very big load, are very staple and are guaranteed to perform at high altitude. Same type that held the world's altitude record with load for 6 years.

One small scout T.M. converted to OX5 single place $850.00. Does 100 M.P.H., has 38 gal. gas capacity, just the job for cross country, very classy job.

Ailerons and tail surfaces for S.V.A. entire lot	$35.00
Lot of control surfaces for Avro 504K	$40.00
T.M. lower wings covered class A.	$15.00 each
T.M. landing gear vees	$7.50 each
D-H. Standard wood vees	$7.00 pr.
Distance thermometers radiolite, new	$8.50
New stock 26 by 4 Jenny, Standard or Canuck casings	$10.50 ea.
New 1/2 1926 Fall shock cord	$.25 per ft.
New special nitrate dope, not soup, real dope. 5 gal. can	$10.50
Fiber lined gas hose. No forced landings with gas trouble.	$.60
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word that they arrived in Green Bay after a pleasant trip. They carried many passengers without mishap, other than blowing a tire. They are at present in Antigo, Wis., Prosser's home town.

J. L. Abbott and his partner, Noll, have been flying their Jennie at South Haven, Mich., for some time. There is a good field and an old hangar. They report good business at this popular Summer resort.

William Mast has, at last, set up his newly re-manufactured Canuck. The plane looks good and flys well.

Johnny Huber, who has been flying for the Dycer Airport of Los Angeles, has returned to his home in Chicago to remain for some time. While in the employ of Dycer, he flew many types of planes, including Fokkers, etc.

Muncie, Ind.

On July 1, E. E. Basham, chief pilot of the Muncie Aerial Co., Muncie, Ind., hopped off for Philadelphia in a new Swallow, with Everett Godwin and his Mother as passengers. Eight hours later they landed on the municipal flying field in Philadelphia. On the eastward trip, they flew via Moundsville, W. Va., Cumberland, Md., Washington, D.C., and Baltimore, Md. The return trip was made in 7 hr. 20 min., owing to lack of head winds. In crossing the Blue Ridge Mountains, an altitude of 12,000 ft. was attained in order to take advantage of a West wind. We would hate to try to set a plane down on one of those Blue Ridges.

The Muncie Aerial Co. is fortunate in the number of cross country flights it has been getting so far this year. So far—two to Detroit, two to Toledo, Ohio, one to Three Rivers, Mich., and one to Chicago, one to Marshalltown, Iowa, one to Grand Rapids, Mich., two to Dayton, Ohio, two to Richmond, Ind., four to Ft. Wayne, Ind., one to Mishawaka, Ind., one to South Bend, Ind., four to Indianapolis, Ind., two to Terre Haute, Ind., and one to Hillsdale, Mich., all without one minute's trouble.

They are also enjoying a very prosperous passenger business from our 120 acre flying field. The Muncie Aerial Co. wishes to extend a cordial invitation to all pilots to land when in our vicinity. A repair shop is maintained with supplies and twenty-four hour service.

Gasoline Filling Stations For Planes

The Cities Service Oil Co., of St. Paul, Minn., has announced the opening of the first gasoline filling station for planes in its city. The purpose of the station is to supply gasoline to the air taxi service now operating. Two 500 gallon tanks have been installed, able to fuel four planes at once.

Hotel Has Airplane Service

The Hotel McAlpin, of New York City, has arranged with the Curtiss Flying Service, for air transportation for its guests to any part of the country. Fifteen minutes notice is all that will be needed to obtain reservation. A daily trip to the Sesqui-Centennial Exposition will also be inaugurated from the hotel within a few days.

Rochester, N. Y.

By Mildred B. Scales

General Umberto Nobile, Captain of the Norge in the Amundsen-Ellsworth Arctic Flight, was in Rochester recently, visiting his cousin, Dr. Francesco Peluso. When the famous Italian aviator arrived here for his brief visit from Akron, Ohio, he was met by Mayor O'Neil and a delegation of prominent citizens, headed by a band. The guest was escorted to the Genesee Valley Club, where a dinner was given for him. He was then taken to the Chamber of Commerce, where he made a brief address.

The McDermott-Talaska Corporation, of which Thomas McDermott of LeRoy is president, and Thomas Talaska, also of LeRoy, is manager, is busy this Summer taking passengers

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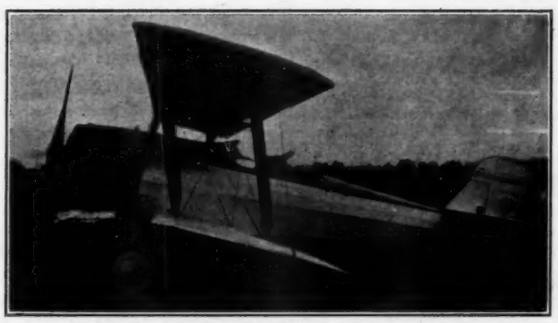

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Performance.

With Salmson,		With 180 Hisso,	
Maximum speed	135 M.P.H.	Maximum speed	125 M.P.H.
Minimum speed	45 M.P.H.	Minimum speed	40 M.P.H.
Pay load	800 lbs.	Pay load	700 lbs.
With Wright J-4,		With OX-5,	
Maximum speed	130 M.P.H.	Maximum speed	90 M.P.H.
Minimum speed	42 M.P.H.	Minimum speed	38 M.P.H.
Pay load	800 lbs.	Pay load	350 lbs.

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for flights from Britton Field, Rochester. They have 20 student-fliers, in addition to carrying regular passengers.

The firm has two Curtiss Orioles and two Standards, one of which, "The Balsalms" was used on flights between New York City and Dixville Notch, N.H., a year ago. The pilots also do aerial photography and exhibition flying. For passenger flights they receive $3 for flights over the field, $5 for flights over the city, and $10 for flights to Lake Ontario, a distance of about 12 miles from the field.

The pilots are Lieut. Otto Enderton, chief pilot, Lieut. R.S. Enslow, second pilot, both of Rochester, and Lieut. H. A. McKay, of Caledonia, third pilot. The mechanics are Earl Wilson, of Rochester, and William Fitzgerald, of Ithaca.

Clifford Sparfield, of the Irving Parachute Company, Buffalo, gave thousands of persons assembled on and near Britton Field, Rochester, a thrill but failed to establish any new marks for his specialty on Sunday, July 18. A traffic snarl taxed the resources of motor vehicle inspectors and police for hours before the advertised time for the jump and for hours afterward. Conservative estimates placed the number of spectators at more than 10,000.

Three airplanes, owned by the McDermott-Talaska Aircraft Corp., were on the field, a Curtiss Oriole, piloted by William Dunlop, in which the parachute jumper was carried, and two planes for newspapermen. The crowd held its breath as the airplane carrying Mr. Sparfield soared upward and while he walked out on the wing of one of the planes.

Because of the strong wind the man did not jump before opening the parachute. The descent from the airplane required just one minute, the jumper alighting safely in the middle of the field. Mr. Dunlop then performed a series of stunts in his airplane over the heads of the multitude on the field. Officials of the aircraft corporation said that more than 200 spectators rode in the company's airplanes after the exhibition flying.

Ryan Airlines Bring McPherson Photos

When the plane, which was racing toward Arizona to obtain the photographs of the evangelist, Aimee Semple McPherson, missing for several weeks, and whose appearance at Agua Prieta caused a sensation, was forced to land, word was sent to Claude Ryan, of the Ryan Airlines, Inc., San Diego, Cal., and ten minutes later the pilot had started in his own monoplane for Douglas. Flying at 135 m.p.h., Ryan reached his destination and was informed that an attempt would be made to rob him of the pictures. A telegram warning him to land in the Santa Suzanno Pass, where he would be met by representatives of *The Evening Express* and several deputy sheriffs, was given to him. At this point he made contact with the officers and a reporter, under whose escort he reached Los Angeles and delivered the pictures.

Thieves Fly Away With Plane

Walter Anderson, of Richmond, Ind., upon going to his hangar recently found that an airplane left there the night before had been stolen. Had the thieves been able to start the second plane, it would have accompanied the missing one on its trip, as the owner found that efforts to start the engine failed, owing to ignorance on the part of those committing the robbery.

Cheaper to Travel By Air

With the accord now existing between Germany and France over air navigation, the Compagnie Internationale de Navigation has reopened the station at Strasburg and air lines between Prague and Strasburg, with stops at Nuremburg, are in operation. Including sleeper, the trip from Strasburg to points outside of France is less expensive than by train, the charge by airplane being $40.00 and by rail $50.00.

Jewels, silks, automobile parts and certain foods may be sent by airplane over this route, packages being limited to 50 kilograms in weight. The tariff for gold and silver and precious articles is doubled and bank bills, stocks and bonds, etc., are charged at a quadrupled rate.

Bureau of Standards Exhibit at Sesqui-Centennial

In order to show methods of testing aircraft engines and the difficulty experienced in this work, the Bureau of Standards has installed an exhibit of wide range at the Sesqui-Centennial Exposition, in Philadelphia. All phases of this testing are shown.

Three altimeter chambers have been constructed, where engines can be tested under service conditions. In a concrete chamber, having heavy walls and air-tight doors, the engine is mounted. Large rotary vacuum pumps are used to withdraw the exhaust gas, reducing the air pressure within to that of the desired altitude. The temperature is raised to the figure wanted by passing the air to the carburetor over ammonia coils. An electric generator, placed outside of the chamber, is used to couple the engine, for the absorption and measuring of the power. The various instruments, used to measure air flow and pressure, water and oil temperature, are grouped outside the chamber.

Catches Ball Thrown From Airplane

Establishing a world record for a feat never before accomplished, Babe Ruth, in his seventh attempt, succeeded in catching a ball tossed from an airplane over Mitchel Field, at an altitude of 300 ft. The plane was piloted by Capt. H. McClelland who first dropped the ball 1,000 ft. above the field. With the failure of each attempt, Capt. McClelland brought the plane lower, when for the seventh time the ball fell and was caught by the famous fielder.

U. S. Air Forces

The Naval Air Pilot

A new publication, *the Naval Air Pilot*, which contains complete navigational information for the use of naval aviators, similar to the coast pilots issued for mariners, has been prepared by the Navy's Hydrographic Office.

The Naval Air Pilot is divided into two parts. The first part contains rules of the road for aircraft; the uniform state law for aeronautics which has been adopted by Delaware, Hawaii, Idaho, Michigan, Nevada, North Dakota, South Dakota, Tennessee, Utah and Vermont; aircraft weather reports sent out by naval radio, system of storm warnings issued by the weather Bureau, aircraft distress signals; restrictions to flying in certain localities; and a list of naval aviation and Army Air service strip maps.

In addition, the first part contains a list of naval air stations and Army Air Service fields and their location. Coast Guard stations, placed at intervals along the coast for the purpose of aiding shipping in distress, are listed completely, with their distinguishing marks. The Pilot states, in connection with the Coast Guard stations, that, in cases of emergency, aid will be furnished aircraft.

The second part of *the Air Pilot* is issued in sections. Each section covers a State and gives a general description of the topography, both inland and along the coast, together with maps and charts showing the seaplane anchorages and landing fields within the State and such other specific information as is considered of value.

The first part of *the Pilot* will be issued to each naval aviator to be kept until he is placed on the retired list or otherwise becomes separated from duty involving flying. The second part of *the Pilot* will be issued to naval air stations and aircraft squadrons. The publication will be corrected and supplemented from time to time, when necessary, by the *Notice to Aviators*, a monthly pamphlet issued by the Navy Hydrographic Office.

The information contained in *the Naval Air Pilot* has been obtained principally from the Weather Bureau; Geological Survey; Coast and Geodetic Survey; Bureau of Aeronautics; Navy Department; Air Service, United States Army, and the legal research section of the Congressional Library.

AIRPLANES FLYING BOATS MOTORS SUPPLIES.

New JN4D airplane $1350.; slightly used JN4D $1075; good used Canuck $975.; newly linen covered Oriole, less motor, tip-top condition, $1375.; high lift C-6 motored bi-plane, 120 miles per hour, 3 place $3000.; splendid used Liberty motored Dayton-Wright, 4 place ship, $3000.; new 220 Hispano motored Standard, unassembled, $1350. or assembled and set up $1500. These ships have always been well stored and are splendid values.

New high compression 12 Cyl. Liberty motor, only $1650.; Liberty connectiug rod bearings $4. per pair; low compression piston $6.50; piston pin $1.85; piston ring 40c; AC or Champion Spark plug for Liberty 40c; Mica Spark Plug for Liberty 75c.

Model I Hispano new piston $13.50, Hispano wrist pin $1.25; wrist pin bushing $1.; new Hisso nose type radiator—a dandy $95.; intake valve, big neck $2.; exhaust valve, heavy, $2.50; Hispano compression rings 40c each; oil rings 50c; new Hispano Dixie Magneto $30. or Simms $25. clockwise or anti.

All Parts for JN4D, Canuck, Standard, OX5, OXX6, and many Liberty, Fiat, Hispano, LeRhone, Lawrance and Clerget parts. New OX5 motors $500.; new OXX6 motors $600. or Navy overhauled $375.; new 80 H.P. LeRhone motor $125.; new 2 cyl. 28 H.P. Lawrence $125.; Canuck, JN4D or Standard longeron $3.; complete set aileron cables for JN4D $15.; complete set elevator control cables $5.; front to rear footbar wires 75c each; rudder wires $2.80 per side. New fresh ½″ shock absorber cord 55c yd. or 1923 stripped ½″ 37½c yd.; new ⅝″ 80c yd.; 26 x 4 new tubes $2.50; new casings $10. or slightly used $7.50, or moderately used $5.; DH casings $10.; new DH wheels $8.50; new tube $4. JN4D upper or lower wing $90.; Canuck lower wing $90. Standard lower wing $90.

Gov't specification cotton cloth 65c yd., or 65 or more yds. at 57½c yd.; splendid linen 80c yd. or 65 yds. or more at 70c yd.; 2¼″ scalloped cotton tape 6c yd. or approx. 100 yd. rolls at 5½c yd.; 2¼″ plain edge cotton tape 4c yd. or approx. 180 yd. rolls at 3½c yd.; scalloped linen tape 8½c yd.; linen rib cord 1c yd. or $3.50 lb.; linen thread 50c spool; double pointed 10″ needle 40c; curved needle 50c.

5 gals. new nitrate dope $10. or 50 gal. barrel $80.; 5 gals. good acetate dope $9.; bamboo or metal wing skid for JN4D or Canuck $1.50; bamboo for Standard $2.; rotary map case—rotate as trip progresses $3.50; leather magneto cover 90c; JN4D gas tank gauge $5.; Canuck type $5.50; wing rib cap stripping ½″ wide 2½c ft. or ¾″ wide 4c ft.

Italian wide-vision gogglette $4.25; French gogglette $4.; Non-shatterable goggles:—NAK wide-vision, amber $5. or clear $4.50; Jumbo oval $3.25; Triplex green top, clear bottom wide-vision $4.50 or clear $4.; Triplex oval $2.50; Tan leather Helmet $3.75, or chamois lined $5., or all chamois —new style $5.50; Gosport Set $12.50; intercommunicating phone set for instruction $20. Leather breeches $12.; leather coat $18.50; flying suit, khaki or white $10.50.

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AIR CHUTES IRVIN TRADE MARK

Closing of Woodward Field, Salt Lake City

In 1925 it was stated by the War Department that it was not the intention at that time to discontinue the flying training being given at Woodward Field, Salt Lake City, Utah. However, in the past few months this question has been restudied and it has been found that the per capita cost of training reserve officers is materially greater than the corresponding cost at other reserve airdromes in the 9th corps area. This is due in part to the fact that the great altitude of the Salt Lake Valley only permits the use of service airplanes, which are more difficult to fly and more costly to supply than training planes. Another factor is that the number of reserve officers undergoing training at Woodward Field is comparatively small. Therefore, in consideration of these conditions, and upon recommendation of the Chief of Air Service, the Secretary of War has decided to close Woodward Field and to transfer the Regular Army personnel and material to other centers of aerial activity in the 9th corps area.

Marine Corps Officer to get Schiff Trophy

A report has recently come from the Naval Air Station, San Diego, Calif., to the effect that Capt. H. D. Campbell, U. S. Marine Corps, now stationed at the San Diego Air Station, has been selected as a candidate for the Herbert Schiff Memorial trophy, for the greatest number of hours in the air without a serious accident.

This trophy, it will be recalled, was donated by the family of Herbert Schiff, United States Naval Reserve Corps, who was killed through accident while flying about three years ago. It is a beautiful engraved cup which is competited for annually by the Navy and Marine Corps aviation personnel, with the name of the winner engraved thereon.

Captain Campbell's flying time, without accident, for the year ending June 30, 1926, amounted to 839 hr. and 50 min. This officer, over a period of about five years, has had a total of 2,404 hr. 10 min. in the air without ever having had a crash or even a damaged landing gear.

Airplanes Used in Whaling

The Bureau of Fisheries of the Dept. of Commerce, in a report recently issued, tells of a new use to which the airplane has been put. The Consolidated Whaling Corp., of Victoria, B.C., using a Boeing seaplane fitted with special pontoons will be devoted to whale scouting.

The use of seaplanes in the industry has been the subject of investigation by leading governments of the World for some time. British Columbia has used the seaplane for the apprehension of violators of fishing laws and fishery interests in Southern California have been employing the plane to scout for sardines.

Seaplanes to Locate Liquor Smugglers

The United States Coast Guard has announced that five seaplanes, equipped with radio transmitting sets, are to be used in finding, from the air, rum smuggling ships. Information as to the whereabouts of these ships will be communicated to Coast Guard cutters, who will prepare to capture these vessels.

Army Aviators Will Fly to Venezuela

Secretary Davis, of the Dept. of War, has announced a flight of two amphibian planes from France Field, Canal Zone, to Maracay, Venezuela, with stops at Cartagena, Barranquilla and Girardot, in Columbia, Willemstad, Island of Curacao, Maracaibo, Valencia, and Maracay, Venezuela. Permission from foreign countries along the route has been obtained and it is estimated the flight will take 20 days. The object of the flight is to serve as as a service test of the operation of amphibian planes in tropical countries. Three officers and one mechanic will be selected from the following: Maj. Junius W. Jones, Lieut. Dale V. Gaffney, Lieut. Charles W. Sullivan, Master Sergeant Bernard Wallace and Technical Sergeant James Gall, at France Field. The date of the flight is to be announced later.

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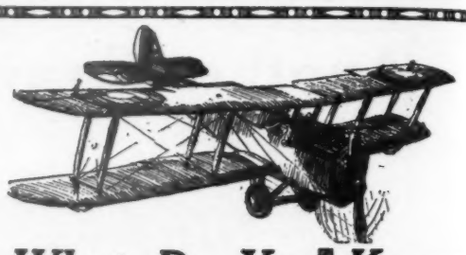

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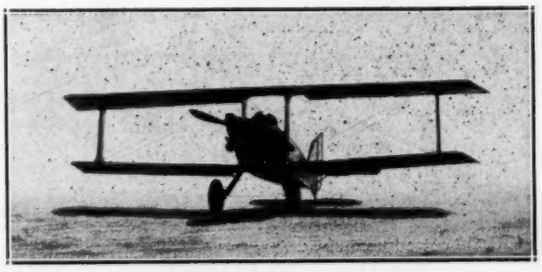

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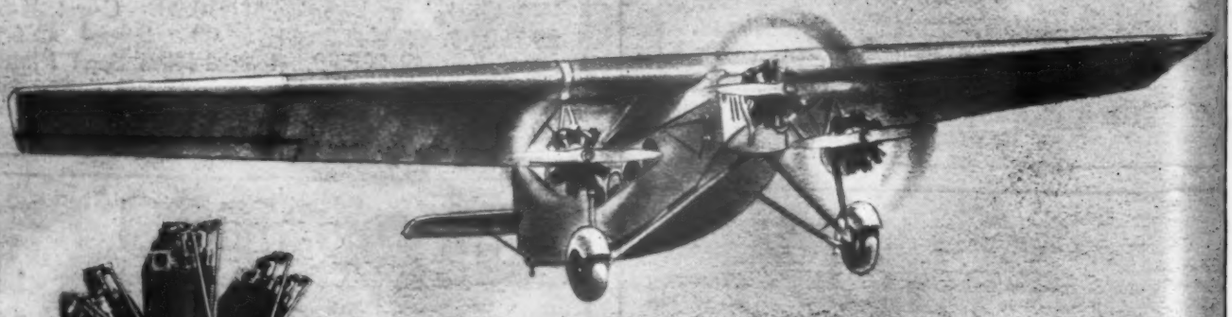

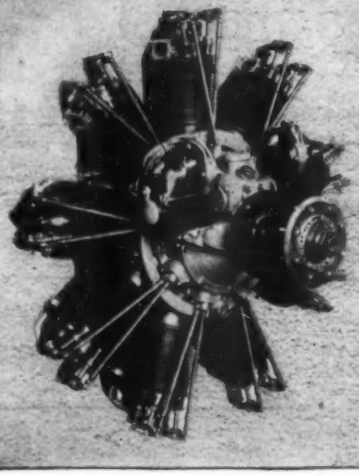

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